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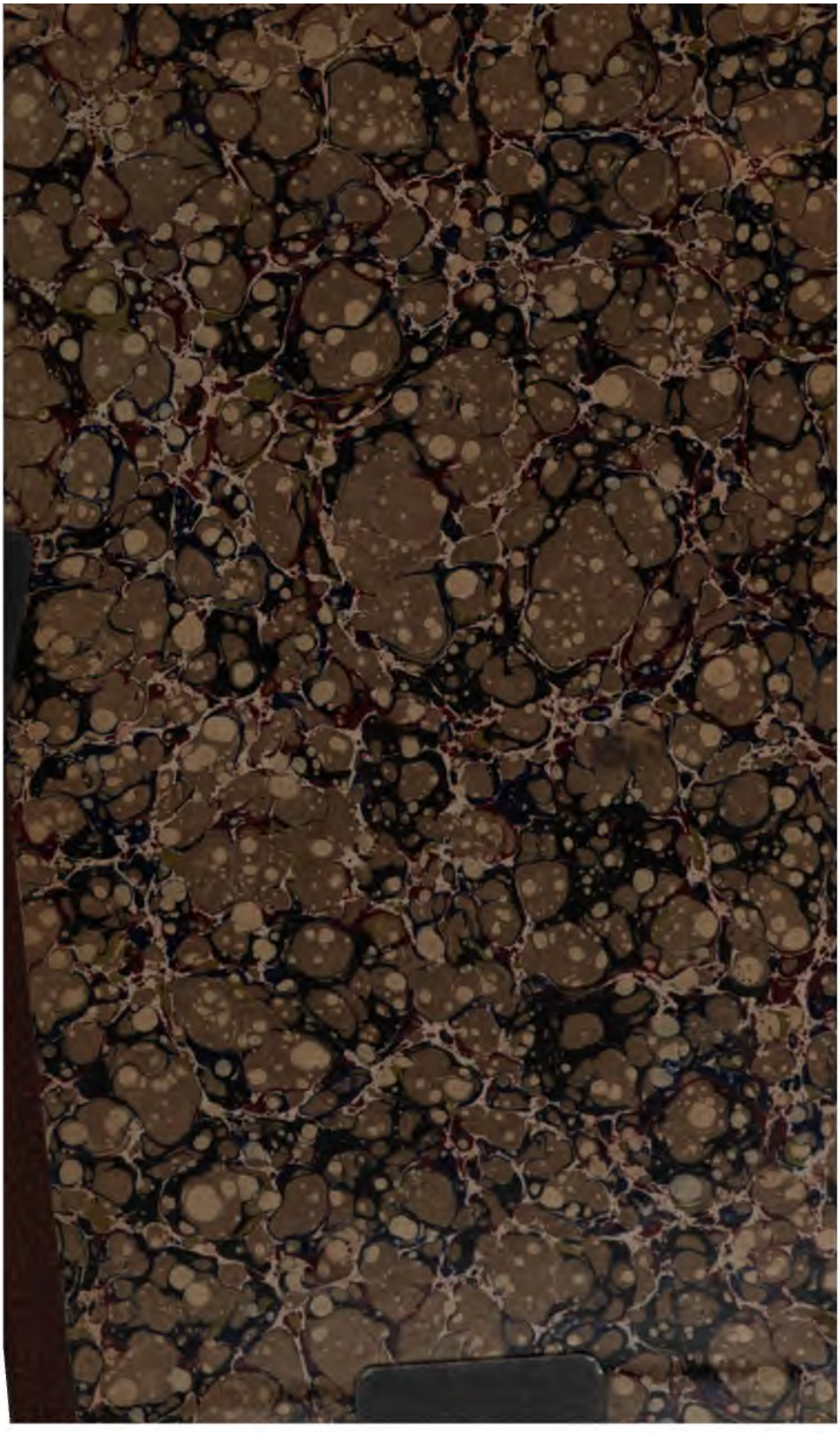

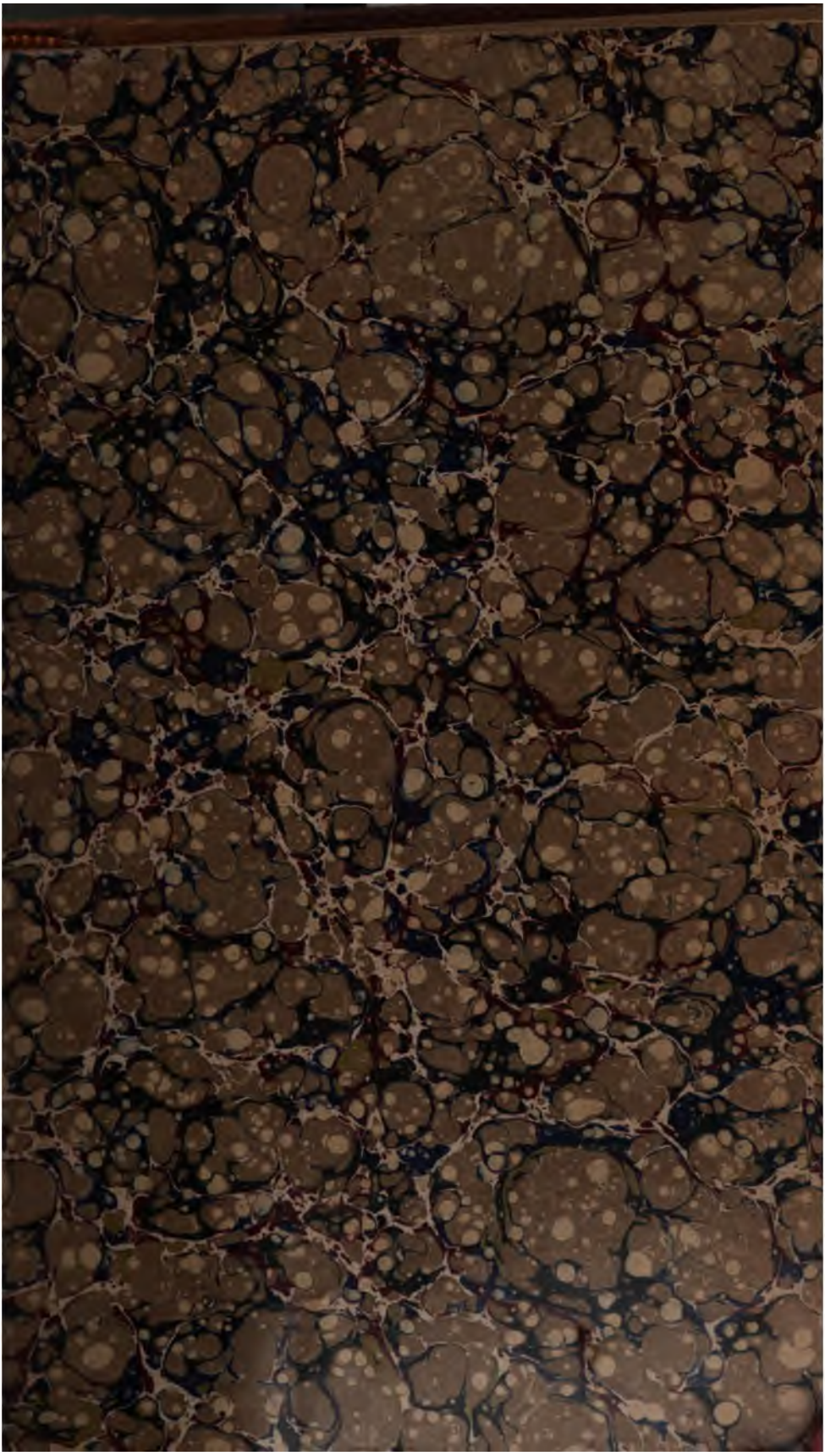

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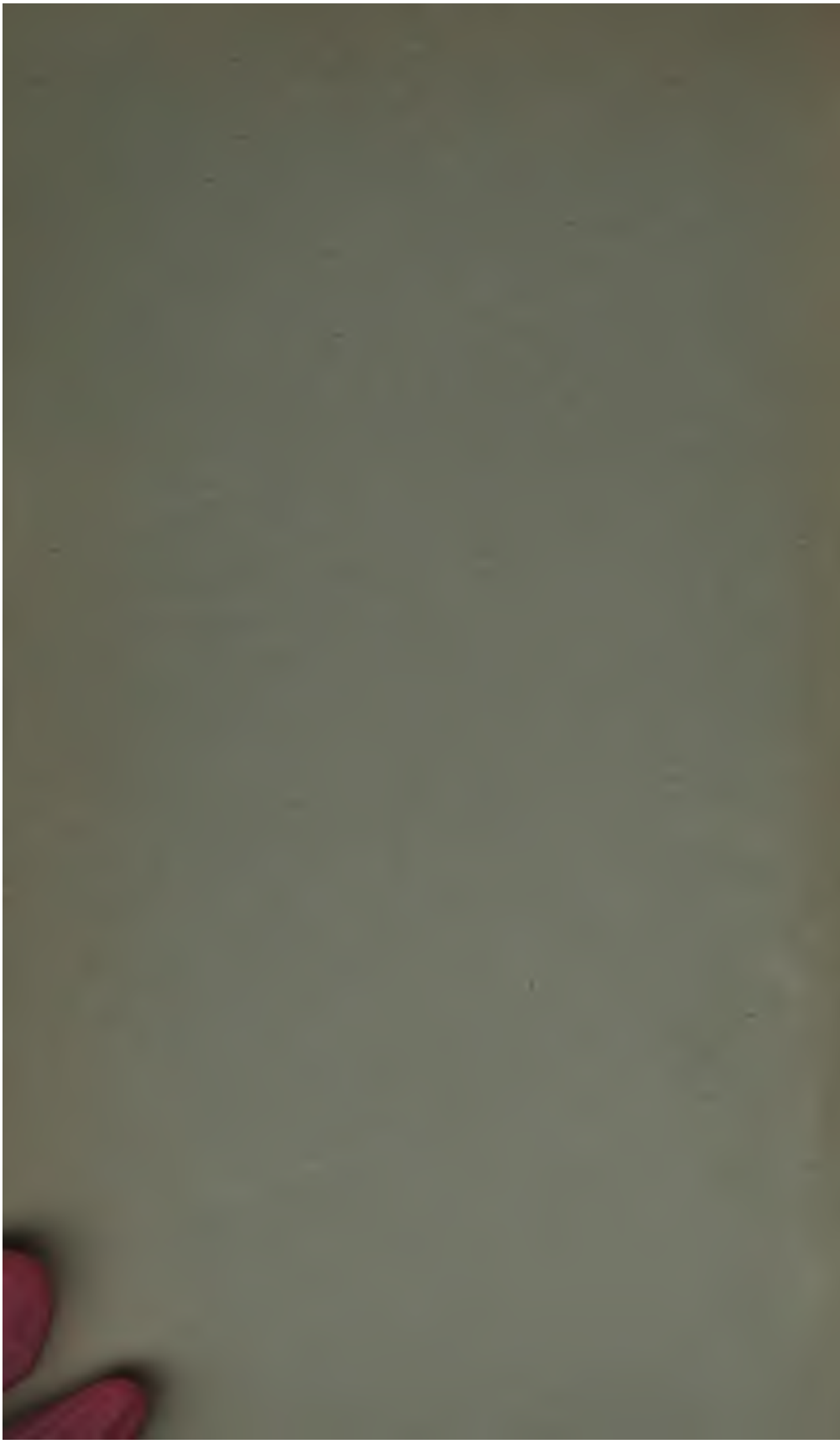

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VOLUME XXXIV.

DIPTEROLOGICAL NOTES.—I.

MICROPEZIDÆ.

(Plates I-II.)

BY E. T. CRESSON, JR.

This paper is the result of a short study of the material in the collection of the Academy of Natural Sciences of Philadelphia, which is mostly neotropical, and includes some species that have been but little noted heretofore. I have taken the liberty of redescribing those of which, to my knowledge, only the brief original description exists, and have therefore given many additional characters of specific value.

The male genitalia holds very good characters, and I have therefore given a few figures showing their variations. The ovipositor of the female, mentioned in the following descriptions, unless otherwise designated, refer only to the first section, not to the retractile portion.

Osten Sacken, in his "Diptera from the Philippine Islands" (Berl. Ent. Zeit., xxvi, p. 194, 1882), describes the chætotaxy of the Micropezidæ, which I will give for those species treated herein. Of the thorax there are two præscutellars, two supra-alars,—one of which may be called the postalar,—two notopleurals, two scutellars, with the following exceptions: *Calobata nebulosa* Lw. has another bristle before the præscutellars; *C. annulata* Fab. and the genus *Micropeza* have no præscutellars. The pleuræ of the genera *Calobata* and *Cardiacephala* have no distinct bristles, but there are one or more series of long hair-like bristles on the posterior portion of the hypopleuræ. In the genus *Micropeza*, on the other hand, there is a strong sternopleural bristle, with several minute ones below it,

but no hairs on the hypopleura. The chætotaxy of the head varies and will be treated in the description of each species; but there is a common absence of the ocellar bristles in all genera, and of the frontal bristles in the genus *Micropeza;* but the inner and outer verticals are present in all genera.

MICROPEZA Meigen.

Illiger's Magazine, ii, 276, 1803.

Head somewhat conical, projecting forwards beyond the eyes, and the occiput much swollen posteriorly; the front and cheeks nearly parallel; antennæ short, third joint rounded; thorax narrow, elongate; abdomen slender; auxiliary vein wanting; discal and second basal cells united; apical cell narrowed or closed apically.

PARTIAL TABLE OF NORTH AMERICAN SPECIES.

1. Apical cell closed and petiolate (for this group, see "Biologia," Diptera, vol. ii, p. 364; includes, as far as known, only the Mexican species).
   Apical cell open, or closed in the margin of wing.....2.
2. Hind femora banded near the apex; small species (4 mm.), Mexican.
   nigricornis v. d. W.
   Hind femora not banded; larger species.....3.
3. Thorax and abdomen rufous; apical cell closed in the margin.
   producta Walk.
   Thorax, but especially the abdomen, black above; apical cell open.....4.
4. Posterior part of mesonotum with a large yellow area; vertex yellow, marked with brownish lines; antennæ in both sexes black..**turcana** Town.
   Mesonotum not so marked; vertex mostly black; antennæ of male only with third joint yellow.....**ambigua** var. nov.

Micropeza turcana Town., Trans. Kans. Acad. Sci., xiii, 136, 1894.

One ♂. Highrolls, New Mexico (Viereck and Rehn). This specimen agrees so well with the typical description that there seems to be no doubt about it being this species, but it shows a few characters that differ from the typical, and which, with some additional characters, I will note here: the brown side stripes of the posterior portion of the front, and the vertex, noted in the typical description, are connected by other lines which divide that portion of the head into yellow areas. The main stripes run from the upper corner of each eye over the vertex, passing just inside or including the outer verticals, then passing on down the occiput, where they unite with each other at the neck; another pair leave the main pair about opposite the ocellar tubercle, includes the inner verticals, and unites

with each other in an irregular spot at the post-verticals; a third pair descend vertically from the main pair to the posterior orbits of the eyes.

The principal differences between this and its variety *ambigua* are given below.

Micropeza (turcana) ambigua var. nov. (Pl. I, figs. 1, 2).

Male.—Yellow to whitish below, marked with black or brown as follows: a median frontal vitta from the black ocellar tubercle nearly to the base of antennæ; vertex and upper part of occiput, also a brown spot on the occiput under the neck; a spot in each antennal foveæ; second and base of third antennal joint and the bare arista; *dorsum of thorax* limited on each lateral margin by a yellow stripe running from the neck to base of wing, this yellow stripe encroaches on the dorsum anteriorly, constricting the black portion to about the width of the neck; postalar callus yellowish. The scutellum brownish, with a darker median spot. The pleura with a brown stripe running from the neck to, and connecting with, the black metanotum; a brown or black stripe on the ventral part of the sternopleura running from the fore to the middle coxæ. *Dorsum of abdomen* black, with narrow yellow or whitish posterior and lateral margins of segments 2-6, wider on the sixth. Genitalia yellow, with brownish marks; the yellow clasps beneath the fourth segment conspicuously developed (see Figure 2). *All coxæ* whitish; femora dark yellow, without rings; tibiæ darker yellow, black at apex; all tarsi black. *Wings* yellowish-hyaline; veins rufous; apical cell open; posterior cross-vein slightly bowed out; anal cell not acute.

Female similar, but the frontal vitta is wider; antennæ entirely black; the yellow margins of the sixth abdominal segment not broader than the preceding segments; first joint of the ovipositor nearly one-half as long as the abdomen, brown, yellow on the lateral margins towards the apex; second joint black.

Length 6-7 mm.

Numerous specimens of both sexes. Cloudcroft and Highrolls, New Mexico (Viereck and Rehn).

This is without doubt a variety of *M. turcana* Town., being distinguished by the entirely black vertex, and the mesonotum without the yellow median area.

CALOBATA Meigen.

Illiger's Magazine, ii, 276, 1803.

Head not conical, but more or less hemispherical or rounded; the lower part only of the occiput generally being turgid; antennæ short, third joint rounded or oval. Thorax stout, but more or less attenuated anteriorly. Abdomen rather stout; the genitalia sometimes greatly developed. Auxiliary vein of wing present; discal and second basal cells separated by the usual cross-vein; last two sections of the fourth vein of about equal length; apical cell nar-

rowed or closed apically; anal cell large, sometimes with a long attenuated lobe.

This genus, at present, holds two very characteristic groups. If, upon further study of those species not herein mentioned, these groups still hold their well-marked characters, they may be, with safety, considered good genera. I have, in the following table—which treats only of those species under observation—made these groups the primary divisions. The difference in form of the genitalia of ♂ and ovipositor of ♀ seems to be the most marked character for their separation. These differences, as well as their specific variations, I have shown, when they exist, by a series of sketches. Those instances where only the clasps of the male are figured, the other parts are similar.

Front narrow, more than twice as long as wide; the ocellar tubercle nearer the occiput than to the antennæ; thorax more or less well developed anteriorly, the humeral calli distinct; the genitalia much developed; the clasps of male, usually situated beneath the third abdominal segment, are membraneous and sessile, greatly enlarged, not filiform; the ovipositor of female short, and irregularly developed, truncate at apex, not extending forward beneath the abdomen.....1.

Front nearly as wide as long; the ocellar tubercle about midway or nearer the antennæ than to the occiput; thorax much constricted anteriorly, the humeral calli indistinct; the genitalia not unusually enlarged; the clasps of male situated nearer the apex of abdomen on a more or less elongated pedicle or common base, somewhat filiform; ovipositor of female long, tapering to a more or less filiform apex, and extending forward beneath the abdomen.....2.

1. Thorax and abdomen yellow or rufous, with a black median stripe, which is sometimes indistinct on the thorax..... **univitta** Walk., ♂, ♀.

   Thorax and abdomen, except the clasps of male, entirely black. **alesia** Walk., ♂, ♀.

2. Wings uniformly blackish, not banded; the costa, between the ends of second and third veins, much less than half the length of the last section of fourth vein..... **diversa** Schi., ♀.

   Wings hyaline or banded; the costa, between second and third veins, nearly as long as the last section of fourth vein.....3.

3. Anal cell short, not much longer than the second basal cell.....4.

   Anal cell more than twice as long as the second basal cell.....6.

4. Head and thorax rufous.....5.

   Head and thorax black; wings hyaline or faintly banded. **antennæpes** Say, ♂, ♀.

5. Wings with distinct cross-bands; hind femora with a preapical ring; hind metatarsi white..... **fasciata** Fab., ♀.

   Wings with a discal brownish cloud; hind femora and tarsi not so marked. **nebulosa** Lw. ♂, ♀.

6. Thorax rufous.....7.
Thorax black or bluish; wings distinctly banded.....8.
7. Wings with two distinct brownish cross-bands and an apical spot; abdomen of a coppery-red color; the apex of second vein about opposite the posterior cross-vein.....**ichneumonea** Brauer, ♂, ♀.
Wings with one distinct cross-band and an apical spot; abdomen bluish-black; the end of second vein far before the posterior cross-vein.
callichroma Big., ♂, ♀.
8. The apical hyaline space wider or as wide as the brown band before it; thorax bluish; no frontal or præscutellar bristles....**annulata** Fab., ♂, ♀.
The apical hyaline space much narrower than the brown band before it; at least two frontal and one præscutellar bristles present.....9.
9. Fore tarsi entirely white; apical cell open; hind femora with a distinctly oblique whitish ring beyond the middle.....**angulata** Lw., ♂, ♀.
Fore metatarsi only white; apical cell closed in the margin; the ring on the hind femora not distinctly oblique.....**lasciva** Fab., ♂, ♀.

Calobata univitta Walker, List, iv, 1049, 1849. (Pl. I, figs. 3 and 4.)

Yellow to rufous, with black or brown markings. *Front* opaque, with narrow silvery side stripes, and a large silvery triangle at each side of the vertex, which are nearly confluent behind the black ocellar tubercle; this tubercle is situated nearer the vertex than to the antennæ; no post-vertical or frontal bristles. Face and cheeks white, silvery in certain aspects; clypeus whitish, not prominent. Antennæ yellow; second joint darker; third about one and a half times as long as the second, apex rounded; arista shortly plumose. Occiput strongly convex; lower part of orbits with a large silvery spot confluent with the silver of the cheeks. *Thorax* shining, with a narrow median blackish vitta, widening over the scutellum; this vitta is more distinct in the male, but is often nearly invisible. Lower part of pleuræ whitish pollinose; metanotum with a black median spot. Halteres whitish. *Abdomen* shining, with a black median stripe, which is broader in the female, interrupted at the incisions; fifth and sixth segments of male distinctly constricted laterally, and the genital segment much enlarged; the translucent yellow clasps of male, situated beneath the third segment, are broad and flattened, their apices bent in form of hooks and their anterior inner margins provided with minute black spines. Ovipositor of female with a black median stripe, broadened laterally at the base, where it is nearly cylindrical, then tapering laterally to a truncate apex (see drawings). *Legs* yellow; hind femora with a preapical blackish band or only a spot underneath at the apex. *Wings* hyaline, with the first posterior cell open; anal cell as short as the second basal cell, the lower angle about right angular. Length 5-7 mm.

One ♂, Highrolls, New Mexico (Viereck and Rehn), and several pairs from Pennsylvania.

In this and the next following species (*C. alesia* Walk.) it will be seen, by referring to figures 3 and 4 of Plate I, which represent the genitalia of these species, that these members are greatly enlarged. The genital segments of male are complicated and more or less globular in form; the clasps, it will be noticed, are broad and rather

membraneous, arising separately from each side of the venter, curving towards each other, provided, at their apices, with hooks, or, as in *alesia* Walk., with knob-like swellings, bent over to serve as hooks. These clasps are to lay hold of the ovipositor (as it is here called), the hooks following into a groove which exists beneath the same. The genital segment of female, or ovipositor, is also, as will be seen (in Figure 4), very much enlarged, of irregular shape, not awl shaped as is general with these members; and are not capable of folding under against the venter. These characters alone are of sufficient value for generic separation when compared with those of the other group (Figures 7 and 8).

This is the common eastern North American species of this group, and may be found upon low herbage in cool shady situations.

Calobata alesia Walker, List, iv, 1048, 1849. (Pl. I. figs. 5 and 6.)

Shining black, with yellow legs. *Front* in the middle, the vertex and upper median part of the occiput, opaque; a narrow silvery stripe on each side of vertex, running from the inner vertical bristle to the vertical orbit, then on down the frontal orbits to the face; no post verticals, but sometimes two or three minute frontal bristles. Face light yellow; clypeus inconspicuous. Occiput much swollen and whitish pollinose below. Proboscis brown. Antennæ darker than face; third joint slightly longer than the second; arista black, minutely plumose. *Thorax* with a narrow lateral pollinose stripe from the humerus to the scutellum; the lower part of pleura also whitish pollinose; between the fore coxæ yellow. Halteres nearly white. *Abdomen* of male with third segment swollen laterally, then constricting to the narrower fifth; the genital segments similar to those of *univitta* Walk.; the clasps are much more enlarged than those of the latter species, their apices with pad-like hooks; between these clasps projects a short double knobbed process which are, as are also the clasps, a translucent yellow. The abdomen of female is cylindrical; the ovipositor is also black, of an irregular shape, being wider than the abdomen, with a cordate base, and tapering slightly to a truncate triangular apex. Hind tibiæ and a band near the apex of hind femora black or brown. *Wings* hyaline; veins yellow toward the costa; first posterior cell open; anal cell short. Length 6 mm.

Both sexes. New Jersey and northern Illinois.

The drawings will readily show where this species differs in regards to the genitalia, and the synoptic table will give other differences.

Calobata antennæpes Say, Journ. Acad. Sci. Phila., iii, 97, 1823. (Pl. I. figs. 7 and 8; II, fig. 9.)

Brown to black, with yellow markings. *Front* black; sides shining; median vitta opaque, with whitish reflection; three or four pairs of frontal bristles. Vertex much wider than front, not differentiated from, but is rounded into, the occiput; the ocellar tubercle is situated about midway between the post verticals

and the antennæ. Face brown, shorter than wide; sides and cheeks silvery; clypeus projecting, shining black. Palpi jet black. Antennæ as long as the face, yellow to brown, with the third joint sometimes black; the latter about twice as long as the second and nearly as wide as long; second joint with a distinct bristle beneath, as long as the third joint; arista black, slender, bare. *Thorax* brownish, dusted above; pleuræ more shining, with whitish bloom below; metanotum whitish pollinose. Scutellum brownish, with two erect apical bristles. Halteres blackish-brown. *Abdomen* brown, shining; first segment the narrowest, with long erect yellow hairs; posterior margins of segments 2-5 narrowly whitish. The genital segments of male not enlarged; the last segment flattened laterally; the clasps are beneath the fifth segment, being two slender filiform appendages on a common pedicle or base, with their anterior mesal surfaces provided with short black spines. The ovipositor of female is more or less awl-shaped, about one-half as long, and as wide at its base as the abdomen, tapering to one-half this width at the apex; the second joint filiform, more or less extended. *Fore coxæ* and basal half of femora yellow; tibiæ black, but tarsi snow white. Middle and hind coxæ, base, sometimes basal half, a preapical ring, and knees of femora, yellow; apical half of tibiæ more or less yellowish; hind metatarsi white. *Wings* hyaline, with a broad brownish band crossing the apical half of discal cell, including the posterior cross-vein; and a brownish apical spot; first posterior cell open; anal cell acute at the apex, as long as the second basal cell; small cross-vein at middle of the discal cell. Length 8-10 mm.

Both sexes. Pennsylvania.

I have made drawings showing the genitalia of this species as typical for this group, but these vary in detail with each species. The difference will be readily seen at a glance, and there is no need of noting them here.

This is the common eastern North American species of this group, and is generally found in the wood upon the bark of trees and on foliage.

Calobata fasciata Fab.

Musca, Fabricius, Syst. Ent., 781, 1775.

Calobata, Wiedmann, Auss. Zwei., ii, 536, 1830.

♀.—Generally rufous, rather shining. *Front*, vertex and occiput rounded into each other without any ridge to differentiate them; one pair of frontal bristle which are opposite the ocelli; these ocelli are slightly nearer the verticals than to the antennæ; no post vertical bristles. Face lighter, more or less silvery. Antennæ shorter than the face; third joint rufous or yellow; arista very slender, bare. *Thorax* more or less pollinose, especially the lower part of the pleuræ. Scutellum with two diverging bristles. Halteres rufous, with darker knobs. *Abdomen* dark brown above; segments with narrow whitish posterior margins. Ovipositor shining brown, about half as long as the abdomen. *Legs* brown, but the posterior and middle femora are more or less yellowish, excepting a brown preapical ring and apex; anterior entirely and the bases of the middle and posterior metatarsi snow white. *Wings* hyaline, with two cross-bands and an apical

spot enclosing a hyaline space, brownish; the first band is before, but not including, the small cross-vein; the second is much wider before and includes the posterior cross-vein; the apical spot is separated from the second band by one-half the width of the band; the apical margin of the second band and the basal margin of the apical spot are both convexed, thereby giving the hyaline space an hour-glass appearance; apical cell open; anal cell short, separated by more than the length of the posterior cross-vein from the margin of wing. Length 6.5 mm.

Jamaica (Johnson and Fox).

The coloring of this specimen, on account of bleaching, may be somewhat paler than in life.

Calobata nebulosa Loew, Centur., vii, 89, 1866. (Pl. II, fig. 10.)

Front rufous; sides shining; middle vitta opaque and whitish pollinose in certain aspects; three frontal bristles, ocelli somewhat nearer the vertical bristles than to the antennæ; vertex differentiated from the occiput, the lateral angles polished. Face yellow, more or less golden; orbits narrowly silvered; clypeus brownish, shining; cheeks linear, silvery; occiput rufous, shining, with bluish reflections above; the lower posterior orbits broadly silvered. Antennæ about three-quarters the length of the face, rufous; second joint darker, with black hairs and one or two long bristles beneath; third joint more or less silvery in certain aspects, about twice as long as the second; arista long, black, shortly plumose. Proboscis and palpi yellow. *Thorax* rufous, shining, especially the pleuræ; the latter with a broad silvery band before the root of the wings, crossing the sternopleura to the hind coxæ. Scutellum like colored. Halteres rufous, knobs darker. *Abdomen* bluish-black, subshining, base more or less rufous. Genitalia similar to *antennæpes* Say, but the clasps of male are nearly sessile, covered with long hairs. Ovipositor dark rufous, about three-fourths as long as the abdomen. *Legs* yellowish, but apex of fore femora and entire tibiæ black. Fore tarsi, except the two apical joints, white. Middle and hind tibiæ and tarsi brown. *Wings* brownish hyaline, with a brown cloud centered about the middle of apical cell and more or less expanded into the surrounding cells; the apical cell open; anal cell short, with an acute angle. Length 7 mm.

Both sexes. Costa Rica and Hayti.

Calobata ichneumonea Brauer, Sitzungsber. d. k. Akad., xci, 388, 1885. (Pl. II, fig. 11.)

Van der Wulp, in the "Biologia," Diptera, vol. ii, p. 374, gives a translation of the original description and additional notes, which fully describes this species. The clasps of the male genitalia are rather more complicated than the others, and the figure given on the plate will be sufficient for identification.

Both sexes. Mexico.

Calobata callichroma Bigot, Ann. Soc. Ent. France, 373, 1886.

This species is also noted by van der Wulp, and as these specimens are rather mutilated, I cannot give any further notes, except

that there is only one frontal bristle, and the yellow clasps of the male genitalia are simple and similar to *antennæpes* Say.

One pair. Mexico.

Calobata diversa Schiner, Novara Reise, 250, 1868.

This species is readily distinguished by its blackish wings and the short second section of the costa.

Two females. Mexico.

Calobata angulata Loew, Centur., vii, 87, 1866. (Pl. II, figs. 12, 13, 14.)

Bluish-black to brownish. *Front*, vertex and occiput not differentiated by ridges. Front brownish, sometimes with bluish-black reflections, subshining, thinly whitish pollinose; a round velvety-black spot in the middle just before the black ocellar tubercle; this tubercle is situated about midway between the post-verticals and the antennæ; three frontal bristles. Vertex with bluish-black subshining lateral angles. Occiput bluish-black, white pollinose above; brown and silvery below. Face shorter than wide, thinly white pollinose, brown at sides, yellow in the middle, with a narrow black transverse line between the foveæ; clypeus brown, shining, with white bloom; cheeks brown, very narrow. Antennæ brown or rufous, as long as the face; third joint three to four times as long as the second, infuscate at base; arista blackish-brown, bare. Proboscis and palpi brown. *Thorax* bluish, subopaque, caused by the whitish granular coating, posterior margin and pleuræ more shining; below the fore coxæ yellow. Metanotum whitish pollinose. Scutellum somewhat more shining than the thorax. Halteres blackish, pedicles yellow. *Abdomen* brownish; first segment with a broad pollinose posterior marginal band; posterior margins of second, to sometimes the fourth segments, white. Genitalia of both sexes similar to *antennæpes* Say, but the clasps of male are again forked posteriorly (see fig. 12). Ovipositor of female shorter in comparison and apex more attenuated, black, apical third shining. *Fore coxæ* and femora brown; tibiæ black; tarsi white, the basal joints somewhat brownish beneath. Middle femora black, apex and extreme base rufous, with a distinctly oblique preapical whitish band (fig. 14); tibiæ and tarsi blackish. Hind femora similar, but base broadly yellowish; metatarsi lighter. *Wings* brownish, with the base and two cross-bands, and more or less of the hind margin hyaline; first band slightly oblique, over the small cross-vein; the second somewhat lunate, beyond the posterior cross-vein, touching the costa just beyond the end of the second vein (fig. 13); apical cell open; anal cell very long, attenuated, ending about the length of the small cross-vein before the margin of wing. Length 8-10 mm.

Both sexes. Paramaribo, Dutch Guiana (Mayo).

Calobata annulata Fab. (Pl. II, figs. 15, 16 and 17.)

Musca Fabricius, Ent. Syst., iv, 338, 1794.

Calobata Wiedmann, Aus. Zw., ii, 534, 1830.

♂.—Similar to *angulata* Lw. The black median frontal spot less defined in outline; no frontal bristles; vertex more or less differentiated from the occiput by a ridge, not rounded. Face without a well-defined transverse stripe at the

oral margin; heavily silvered in certain aspects; foveæ dark brown to black; clypeus dark brown, polished and pollinose. Palpi distinctly marginated anteriorly with white. Antennæ brown; base of third joint reddish, as is also the base of the arista. *Thorax* bluish, more or less shining, pollinose posteriorly, not opaque; pleuræ more shining and silvery; metanotum black, silvery below. Scutellum brownish, shining, but brownish pollinose in certain aspects. Knob of halteres black. *Abdomen* shining, brownish; base of first segment broadly whitish pollinose; hind margins of second and following segments more or less narrowly yellowish. Genitalia not prominent, similar to *antennæpes* Say in that the clasps are simple (fig. 17). *All femora* are black or brown; the basal third and a preapical ring of hind and middle femora, not oblique (fig. 15), translucent whitish-yellow; the fore femora with an indistinct reddish ring just beyond the middle; all tibiæ blackish; anterior tarsi snow white. *Wings* hyaline, with a blackish cross-band between the anterior and including the posterior cross-veins; sometimes a trace of another band before the anterior cross-vein; a blackish apical spot, darker on the basal margin, and more or less hyaline towards the apex, separated from the preceding band by about the width of the band (fig. 16); apical cell open; anal cell long, attenuate, reaching to within one-half the length of the posterior cross-vein from the margin. Length 9–10 mm.

Several males. Paramaribo, Dutch Guiana (Mayo).

This species can be readily separated from *angulata* Lw. by the characters given in the table, and by the above description.

Calobata lasciva Fab. (Pl. II, fig. 18).

Musca Fabricius, Ent. Syst. Suppl., 574, 1798.

Calobata, Wiedmann, Aus. Zw., ii, 535, 1830.

Similar to *angulata* Lw. Front flattened above; the black velvety median spot, especially of the ♀ is more pointed and nearly reaching the antennæ; vertex and occiput separated by a distinct ridge. A black velvety spot between the antennæ and the eyes, touching the latter. Third joint of antennæ yellowish-red at the base, on the inside. Genitalia similar to *antennæpes* Say, but the clasps of male are stouter and wider apart on a broad base. The preapical rings on the middle and hind femora are very narrow, and not at all, or only slightly, oblique; fore metatarsi black. Wings similar, but the apical, lunate, hyaline band is nearer the apex; the apical cell closed; anal cell not as long. Length 7.5-8 mm.

Both sexes. Jamaica (Johnson and Fox), Lower California.

Mr. Johnson records his capture and gives synonyms in his list of the "Diptera of Jamaica," Proc. Acad. Nat. Sci. Phila., 279, 1894.

Cardiacephala longipes Fab.

Musca Fabricius, Ent. Syst., iv, 338, 1794.

Cardiacephala Macquart, Dipt. Exot., ii, 3, 243, 1843.

Generally brownish. *Front* shining, dark brown, with an opaque, brown, median vitta, in which are situated the ocelli about midway between the post-verticals and the antennæ; sides of front, especially the lower portion, wrinkled, with three frontal bristles; vertex polished, very much produced posteriorly

each side of the middle vitta, giving the head a condiform shape at the occiput when seen from above; the outer verticals are situated, each, at the extreme point of these productions; the post-verticals are in the concaved portion at the end of the median vitta; another pair, the inner verticals, are situated before these post-verticals, one each side of the vitta. Occiput likewise produced posteriorly, polished, dark brown below, lighter beneath the vertical productions. Face nearly black, very short, because of the encroaching of the oral margin between the antennal foveæ; a nose-like carina is distinct between the antennæ; a black velvety spot each side of the antennæ, with a whitish spot beneath; cheeks linear, yellowish; clypeus not prominent, brown. Proboscis yellow to brown; palpi black. Antennæ longer than the face, black; third joint four to six times as long as the second, cylindrical to about two-thirds its length, then suddenly tapering to a blunt apex; arista brown, with long pectinations above. *Thorax* brownish; mesonotum brown pollinose; one post dorsocentral, one postalar, one supra-alar, two noto-pleurals. Pleuræ more shining, whitish below, more or less yellowish nearer the coxæ; sternopleura with a series of fine, long, brown hairs; metanotum subshining, whitish. Scutellum abruptly produced above, before the two apical bristles, this callus being brown pollinose, the rest polished. Halteres whitish, knobs black. *Abdomen* somewhat brown pollinose above, excepting the shining first and last segments; the posterior margins of the first broadly, and the following segments, narrowly, whitish margined. Genitalia similar to *Calobata antennæpes* Say, but the clasps of the male are more flattened, yellow at base, black at the tips where they are abruptly bent inwards, and provided with minute spines on their inner edges. Ovipositor of female polished, black. *Anterior legs* blackish; middle and posterior legs rufous or yellowish; posterior femora suddenly thickened just beyond the middle, tapering to the knees. *Wing* blackish; hyaline as follows: base to end of second basal and anal cells, a band over the anterior cross-vein, elongated, a rounded spot in the submarginal cell at end of second vein, another beyond in the closed or nearly closed apical cell, and another beyond the posterior cross-vein; anal cell short, acute; anterior cross-vein at or beyond the middle of the discal cell. Length 8-9 mm.

Both sexes. Paramaribo, Dutch Guiana (Mayo).

The three elongated spots in the apical portion of the wings are very characteristic of this species, as well as the cordate formation of the occiput. The wing is figured by Macquart, and his figure of the head shows the shape of the vertex very well.

Cardiacephala myrmex Schiner, Novara Reise, 255, 1868.

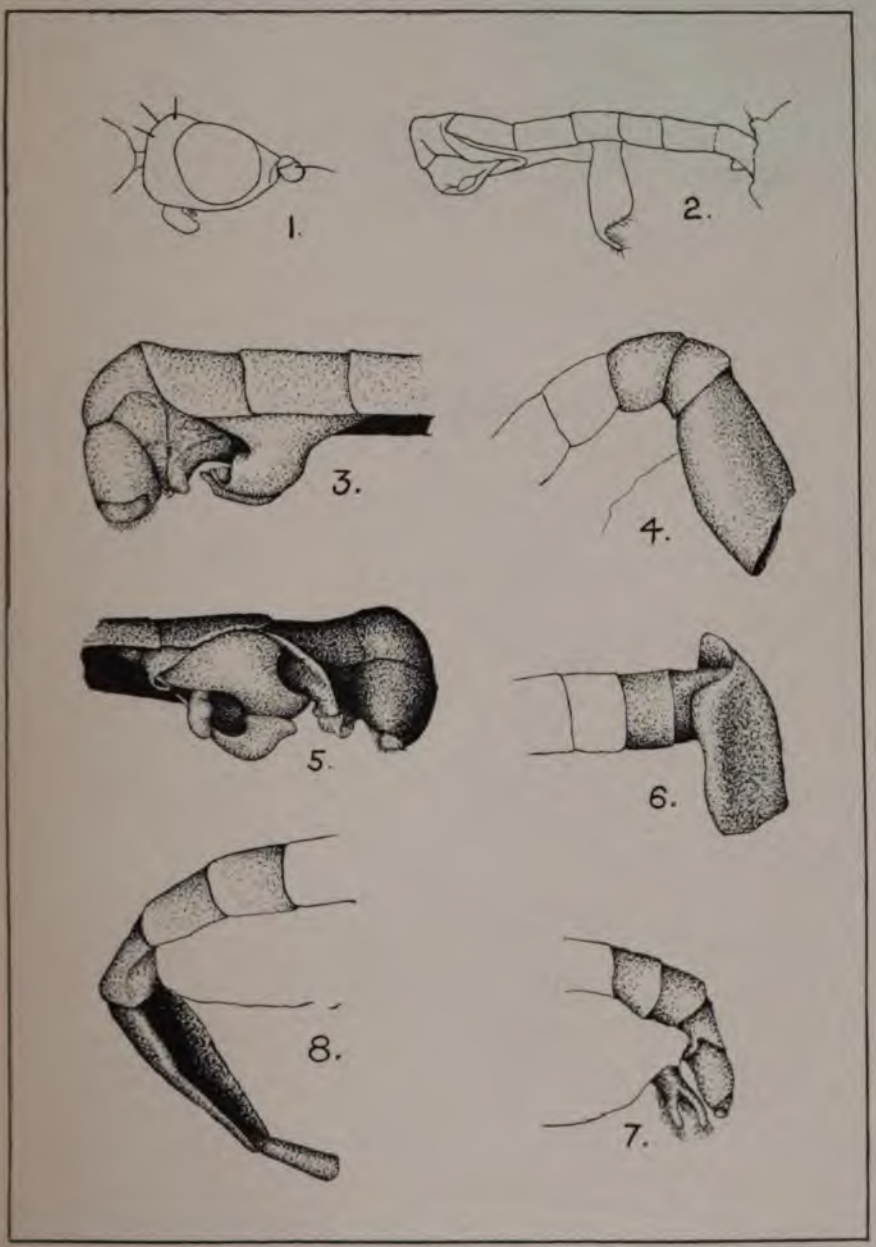
Male. Paramaribo, Dutch Guiana (Mayo).

EXPLANATION OF PLATE I.

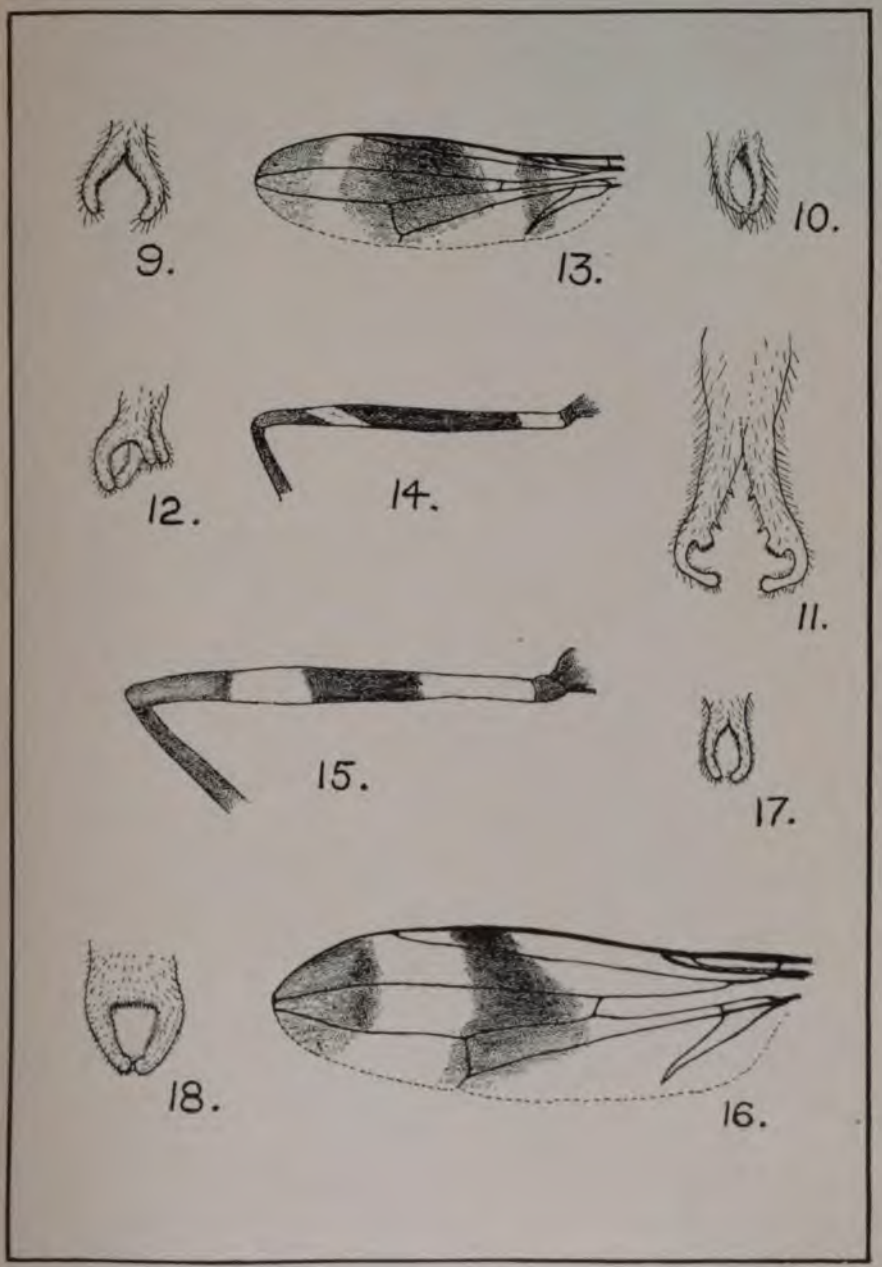
Fig. 1.—*Micropeza ambigua* n. s., lateral view of head.
" 2.— " " lateral view of abdomen of male.
" 3.—*Calobata univitta* Walk., genitalia of male.
" 4.— " " " genitalia of female.
" 5.— " *alesia* Walk., genitalia of male.
" 6.— " " " genitalia of female.
" 7.— " *antennæpes* Say, genitalia of male.
" 8.— " " " genitalia of female.

EXPLANATION OF PLATE II.

Fig. 9.—*Calobata antennæpes* Say, clasps of male.
" 10.— " *nebulosa* Lw., clasps of male.
" 11.— " *ichneumonea* Brauer, clasps of male.
" 12.— " *angulata* Lw., clasps of male.
" 13.— " " " wing.
" 14.— " " " hind femur.
" 15.— " *annulata* Fab., hind femur.
" 16.— " " " wing.
" 17.— " " " clasps of male.
" 18.— " *luscivа* Fab., clasps of male.



E. T. CRESSON, JR., ON DIPTERA.



E. T. CRESSON, JR. ON DIPTERA.

STUDIES IN AMARA.*

BY ROLAND HAYWARD.

During the past few years a large part of my leisure time has been devoted to a study of the North American species of *Amara*. At first I had intended to confine myself to a revision of the subgenus *Cyrtonotus* Steph. (*Leirus* Zimm.), but gradually the field has been extended until all the subgenera represented in our fauna have been included, with the single exception of *Celia* Zimm., the latter having been thoroughly reviewed by the late Dr. Horn some years ago.† *Triæna* Lec. was also studied by Horn at the same time,‡ but for several reasons it has been deemed advisable to include it in the present paper.

In the course of my work I have been much indebted to many kind friends and correspondents who have aided me in various ways, and to them I would express my gratitude.

Through the kindness of my friend, Mr. Samuel Henshaw, of the Museum of Comparative Zoölogy at Cambridge, I have at all times had ready access to the LeConte collection, a privilege of inestimable value. To Dr. L. O. Howard and Mr. E. A. Schwarz of Washington, who have placed in my hands for study all the specimens of *Cyrtonotus* in the collection of the National Museum, I am also under deep obligations, while to Dr. Skinner of Philadelphia I am indebted for the privilege of examining the Horn collection, now a part of that of the American Entomological Society.

My thanks are also due to Messrs. Frederick Blanchard, F. C. Bowditch, H. C. Fall, Chas. Liebeck and H. F. Wickham for the loan, in many cases, of their entire material for several years, as well as to Dr. F. E. Blaisdell and Messrs. P. G. Bolster, John D. Evans, Th. Götzelmann, F. Knaus, J. D. Sherman, Jr., and F. A. Sherriff for the loan and gift of specimens.

Assistance has also been rendered by Herr Edmund Reitter of Paskau, who has kindly loaned me examples of all of the European and of several Siberian species of *Cyrtonotus*.

* This paper was practically complete at the time of Mr. Hayward's death, April 11, 1906. A few lines have been supplied from the original descriptions or from Mr. Hayward's notes.—SAMUEL HENSHAW.

† Trans. Am. Ent. Soc., 1892, xix, pp. 19-40.

‡ Ibid., pp. 18-19.

In many respects *Amara* is one of the most difficult genera of the Carabidæ. Although the members of certain of the subgenera are easily recognizable as such, there are others the species of which resemble each other very closely. Indeed, in those that are distinguished by differences in the secondary male characters, as, for instance, *Amara* proper and *Celia*, there is often much diffiiculty in determining to which subgenus a female should be referred when unaccompanied by specimens of the opposite sex. In all the subgenera of which the species are numerous, there are several bearing a close resemblance to each other, while in some, the extreme forms of which are quite easily recognizable, the specific characters are subject to variation and specimens occur which can only be doubtfully placed. This is especially the case in *Cyrtonotus*, some species of which, as *laticollis*, *carinata* and *adstricta*, are almost incapable of definition. The genus as a whole is singularly devoid of those minor characters such as dorsal punctures, differences in color and markings, spots, elytral foveæ, etc., which are often of great service in the separation of closely allied species. As Dr. Horn says with regard to *Celia*, species "can be properly studied by series of specimens and not by uniques, except they be typically selected."

It may perhaps be well to mention the more important structural characters used in the classification of our species.

The form of the mentum tooth has been used by Zimmermann, and after him, by many authors as a primary character for the subdivision of the genus. In a large majority of the species the tooth is bifid or emarginate at tip, while in those referred to *Amathitis* Zimm. and *Acrodon* Zimm. it is entire. Horn has observed a tendency to variation in the depth of the emargination of some of our species of *Celia*, and has regarded *Acrodon* as a group of species of that subgenus. Putzeys has noted that the form of the acute tooth is subject to variation in *Amathitis*, which is, however, not represented in our fauna.

The antennæ are usually slender. In one species of *Cyrtonotus* they are distinctly thickened. In certain species of *Amara* s. s. the second and third joints are somewhat compressed and carinate; a character of considerable importance.

But little variation is to be seen in the palpi. In *A. arenaria* Lec. the last joint is slightly swollen and acuminate at tip.

The frontal grooves are short, sometimes almost punctiform and often feebly impressed. *A. hæmatopa* Dej. (*similis* Kirby) is, how-

ever, an exception, the grooves in that species being long and extending forward on to the epistoma.

Both supra-orbital setæ are present in all our species. In three European species, however, the anterior is wanting; while in one both setæ are absent. These all belong to the subgenus *Leirides*.

The form of the prothorax, whether wider or not in front of base, is of great importance in the arrangement of the subgenera, while several useful characters are afforded by that member for the separation of species.

No characters higher than specific are derived from the elytra.

From the under side of the body several useful characters are derived. In most of the subgenera the prosternum is distinctly margined at tip, the margin being absent, however, in two of those occurring in our fauna, *Cyrtonotus* and *Leironotus*, as also in *Leirides*, of which we have no representative. In several groups of *Celia* the tip of the prosternum is furnished with setigerous punctures. These are usually two in number, but in the *obesa* group as defined by Dr. Horn, which is the equivalent of *Percosia* Zimm., the tip is plurisetose. I have not detected these punctures in our other subgenera. The punctuation of the sterna and their parapleuræ, as well as of the ventral segments, is often of service, but in some instances the value of these characters has, I think, been overestimated. *Leirides* has been separated by Putzeys on the form of the metasternal episterna.

The legs afford several characters of value. *Triœna* is defined by the trifid terminal spur of the anterior tibiæ, the spur being simple in the other subgenera. The number of setigerous punctures along the inner margin of the femora has often been of service. In *Cyrtonotus* the posterior tarsi, whether grooved or not on the outer side, have aided in the separation of species.

The secondary sexual characters are well marked. In all our species the first three joints of the anterior tarsi are more or less dilated in the males and biseriately squamulose beneath. In most of them the last ventral segment has one setigerous puncture each side of the apex in the males, two in the females. The only exceptions among our species occur in the subgenus *Celia*, a moderate number of which have two setæ each side in both sexes. Several other characters occurring in the males of certain species may be mentioned. These consist chiefly in the dentation of the middle

tibiæ, the presence of pubescence on the inner side of the posterior tibiæ, and the existence of a fovea, groove, deep puncture, or punctured area near the middle of the prosternum. They afford useful means for the definition of subgenera, groups of species and species.

Amara is included in the tribe Pterostichini as defined by Horn. From the other genera of the tribe represented in our fauna, except *Evarthrus*, it is distinguished by the form of the labial palpi, the terminal joint of which is shorter than the penultimate, the latter plurisetose in front. From *Evarthrus* it may be recognized by the absence of a dorsal puncture on the elytra. Its geographical distribution is very wide, extending over the whole of the Palæarctic and Nearctic regions. A number of species are confined to high latitudes and alpine regions.

As now generally adopted its classification is based upon the studies of Zimmermann, successively modified by those of LeConte, Putzeys, Schaum, Horn and Ganglbauer. By the first named author the genus was divided into eight groups, which were regarded by him as genera, while by later authors they have been variously treated as genera, subgenera or groups.

Before passing to the study of our species, it may be remarked that this paper lays no claim to be an exhaustive monograph of the subgenera treated. Such a work would be impossible without a thorough study of foreign material and comparison of types. I have merely attempted to present the results of my studies in such form as to assist in the recognition of our species, and it is hoped that a step has been made toward a rational arrangement of those of which synoptic tables have not heretofore been published. In the tables of those subgenera that have been studied by previous writers, I have, of course, drawn largely upon their work, with such modifications as have seemed necessary.

The genus, as represented in our fauna, may be divided into the following subgenera, which may thus be defined :

Prosternum margined at tip ....2.

Prosternum not margined at tip; prothorax wider in front of base; apical spur of anterior tibiæ simple; hind tibiæ not pubescent on the inner side in the males.

Middle tibiæ dentate or bisinuate on the inner side in the males; form elongate .....i. **Cyrtonotus** Steph.

Middle tibiæ simple in both sexes; form more robust.

ii. **Leironotus** Ganglb.

2. Anterior tibiæ with the apical spur simple.....3.
Anterior tibiæ with the apical spur trifid; prothorax not wider in front of base; hind tibiæ pubescent on the inner side in the males....v. **Trisena** Lec.
3. Prothorax distinctly wider in front of base.....4.
Prothorax not or scarcely perceptibly wider in front of base.....5.
4. Posterior tibiæ not distinctly pubescent on the inner side in the males.
iii. **Leiocnemis** Zimm.
Posterior tibiæ distinctly pubescent on the inner side in the males.
iv. **Bradytus** Zimm.
5. Posterior tibiæ distinctly pubescent on the inner side in the males.
vi. **Amara** s. s.
Posterior tibiæ not distinctly pubescent on the inner side in the males.
vii. **Celia** Zimm.

Subgenus **CYRTONOTUS** Steph.

Prothorax distinctly wider in front of base. Prosternum not margined at tip. Anterior tibiæ with the apical spur simple. Males with the middle tibiæ dentate or bisinuate on the inner side. Posterior tibiæ not pubescent on the inner side in the males.

The present subgenus includes our largest and most elongate species. Morphologically it is separable from *Leironotus* only by the structure of the middle tibiæ of the males, while for its separation from the other subgenera represented in our fauna an additional character is afforded by the absence of a margin at the tip of the prosternum. The species composing it cannot, however, be confused with any of the others, and, in fact, it forms one of the extremes of the genus, some of its members bearing a much greater superficial resemblance to *Pterostichus* than to the other subgenera.

Some differences occur among the species in the dentation of the middle tibiæ of the males. In all those occurring in North America, except *A. hæmatopa* Dej. (*similis* Kirby), they are bidentate on the inner side, while in the latter they are feebly bisinuate. The species differ to some extent in the relative positions and prominence of the teeth. In one European species, *A. aulica* Panz., the middle tibiæ are tridentate.

In addition to the difference in the structure of the middle tibiæ, the sexes are readily distinguishable by the dilation of the anterior tarsi of the males and the difference in the number of anal setæ, of which there are two each side in the females, one in the males.

Nearly all the species of this subgenus are northern in their distribution, being represented in both the palæarctic and nearctic regions. Several species have been described from North America

which remain unrecognized in this country. The original descriptions will be found in the appendix, as the works in which they were published are not readily accessible to a majority of our students. The species known to me as occurring in our fauna are quite numerous, but many are not capable of easy definition. The following table is the best I have been able to devise after a long study of a large amount of material:

Antennæ slender; frontal grooves short, not extending anteriorly on to the epistoma; middle tibiæ bidentate on the inner side in the males .....2.

Antennæ thickened; frontal grooves long, extending anteriorly on the epistoma; middle tibiæ feebly bisinuate on the inner side in the males.....9.

2. Thorax narrower at base than apex.....3.

Thorax as wide at base as apex ..... 5.

Thorax wider at base than apex .....8.

3. Thorax very distinctly narrower at base than apex; middle and hind tarsi with the three basal joints deeply grooved on the outer side.

Black; sides of prosternum coarsely punctured; thorax with the sides sinuate immediately in front of the hind angles; males with the teeth of the middle tibiæ smaller and much nearer the apex than usual. Length .57-.62 inch.....1. **pterostichina** n. sp.

Rufous or rufo-piceous; sides of prosternum obsoletely punctured; sides of thorax sinuate some distance in front of the hind angles; middle tibiæ normally dentate in the males. Length .45-.54 inch.

2. **thoracica** n. sp.

Thorax slightly narrower at base than apex.

Posterior tarsi not grooved on the outer side .....4.

Posterior tarsi with the two basal joints grooved on the outer side; middle and hind femora with two or three setigerous punctures along the inner margin; thorax about one-half wider than long. Length .42-.50 inch .....3. **blanchardi** n. sp.

4. Middle and hind femora with four or five setigerous punctures along the inner margin; legs rufous or rufo-piceous.

Slender; thorax nearly twice as wide as long, basal impressions bifoveate, the foveæ subconfluent. Length .45-.50 inch....4. **jacobina** Lec.

More robust; basal impressions of thorax with the inner foveæ obsolete, the outer distinct. Length .48-.50 inch.....5. **stupida** Lec.

Middle and hind femora with two setigerous punctures along the inner margin; thorax with the basal impressions bifoveate, the inner fovea punctate, the outer usually impunctate or more sparsely punctured; legs dark piceous or black. Length .48-.55 inch....6. **bowditchi** n. sp.

5. Hind angles of thorax acutely carinate .....6.

Hind angles of thorax obtusely carinate .....7.

6. Hind tarsi not grooved on the outer side.

Thorax with the sides strongly rounded nearly to base, suddenly and strongly sinuate in front of the hind angles, which are acute, base strongly emarginate; form more convex. Length .45-.54 inch.

7. **adstricta** Putz.

Thorax with the sides rounded, distinctly sinuate some distance in front of base which is slightly emarginate, hind angles subacute; form broader, less convex. Length .45–.57 inch .....8. **laticollis** Lec.

Thorax with the sides less strongly rounded, rather feebly sinuate in front of the hind angles, which are rectangular, base feebly emarginate; form nearly as in *laticollis*. Length .45.–.55 inch.

9. **carinata** Lec.

Form very elongate, nearly parallel; thorax widest in front of middle, sides rounded in front, sinuate behind, hind angles rectangular, base feebly emarginate; elytra twice as long as wide, usually with slight metallic lustre in the males. Length .45–.50 inch.

10. **ruflmana** Kirby.

Hind tarsi with the two basal joints rather feebly grooved on the outer side; thorax widest at middle, sides rounded nearly to base, sinuate in front of the hind angles which are rectangular. Length .37–.44 inch.

11. **cylindrica** Lec.

7. Thorax with the sides sinuate behind, hind angles rectangular; posterior tarsi with the three basal joints grooved on the outer side.

Form elongate, feebly convex, subparallel; middle tibiæ of the males with the teeth much nearer the apex than usual. Length .33–.35 inch.

12. **hudsonica** n. sp.

Form more robust; middle tibiæ of males normally dentate.

Basal impressions of thorax with the foveæ slightly oblique, convex, nearly black, slightly æneous. Length .38–.42 inch.

13. **eschscholtzi** Chaud.

Basal impressions of thorax with the foveæ perpendicular to the base; less convex, the elytra slightly flattened on the disk; thorax more deeply emarginate at apex, black; elytra usually brownish. Length .38–.44 inch.....14. **melanogastrica** Dej.

Thorax with the sides at most obsoletely sinuate in front of the hind angles which are obtuse, black; the elytra often brownish; hind tarsi with the three basal joints not or very feebly grooved on the outer side. Length .33–.45 inch... .....15. **brunnipennis** Dej.

8. Thorax very slightly wider at base than apex, elongate, convex, nigropiceous; sides of thorax arcuate in front, sinuate behind, hind angles rectangular, acutely carinate; legs rufopiceous, three basal joints of hind tarsi grooved on the outer side. Length .44 inch.

16. **infausta** Lec.

Thorax distinctly wider at base than apex.

Elongate, rufopiceous or piceous; thorax slightly wider than long, sides arcuate, obsoletely sinuate in front of the hind angles, which are obtuse and very obtusely carinate; elytra distinctly wider than the thorax, finely striate, the striæ finely punctate in front of middle; legs rufous or rufopiceous. Length .44–.46 inch..17. **elongata** Lec.

Robust, piceous; thorax less than one-half wider than long, sides arcuate, sinuate in front of the hind angles which are rectangular and acutely carinate; elytra scarcely wider than the thorax, deeply striate, the striæ deeply punctate, more finely at apex; legs rufotestaceous. Length .40–.47 inch..18. **pennsylvanica** Nobis (*fulvipes* || Putz.).

9. Elongate, black, above greenish or bronzed ♂, nearly black ♀; thorax one-half wider than long, as wide at base as apex, slightly narrower than the elytra; posterior tarsi with the first joint grooved on the outer side; femora piceous, tibiæ and tarsi rufopiceous. Length .40–.52 inch.....19. **hæmatopa** Dej. (*similis* Kby.).

1. **A. pterostichina** n. sp.—Elongate, feebly convex, the elytra slightly flattened on the disk. Color black, shining. Head as wide as the thorax at apex; frontal grooves deep, punctiform, not extending forward on to the epistoma; antennæ slender, slightly shorter than the head and thorax, piceous, the first three joints slightly paler; palpi rufopiceous. Prothorax subcordate, rather more than one-half wider than long, distinctly narrower at base than apex, coarsely punctate at base and apex, more densely at base; apex truncate, the anterior angles rounded, not prominent; transverse impressions distinct; median line distinct, abbreviated in front; basal impressions broad, deep, obsoletely bifoveate; base truncate; sides with the margin narrowly reflexed, strongly arcuate, suddenly and strongly sinuate a short distance in front of the hind angles, which are subacute, prominent and rather finely carinate. Elytra rather more than one-half longer than wide, scarcely wider than the thorax, subparallel, deeply striate; striæ entire, distinctly punctate to behind the middle, the scutellar stria long, the eighth with the row of ocellate punctures widely interrupted at middle; intervals feebly convex. Body beneath piceous or nearly black; sides of prosternum coarsely punctured; metasternal epistoma impunctate. Legs piceous; middle and hind femora with two setigerous punctures along the inner margin; middle and posterior tarsi with the three basal joints deeply grooved on the outer side. Length .57–.62 inch; 14.25–15.5 mm.

In the males the middle tibiæ are less strongly bidentate than usual, the teeth being much smaller and situated nearer the apex than in most species, while the lower tooth is usually slightly more prominent than the upper.

The grooves on the middle and hind tarsi observable in this and the next species, and less markedly in some of our other Cyrtonoti, recall a similar structure seen in many species of *Pterostichus;* the grooves not being double, however, as in the latter genus. The coarse punctuation at the sides of the prosternum seems unique. In facies it bears a strong resemblance to certain Pterostichi.

I have carefully compared it with the description of *Curtonotus putzeysi* Bates (Proc. Zool. Soc., 1878, p. 600) from Mexico. The latter is described as having the middle tibiæ without teeth on the inner side in the male. These, although small and inconspicuous, are, however, present in *pterostichina*. The two species differ also in size, and the present one posesses several characters of importance not mentioned in the description of *putzeysi*.

It may perhaps be well to note in passing, that, unless *Cyrtonotus*

and *Bradytus* are to be regarded as generically distinct, the name *putzeysi* is preoccupied (Horn, Trans. Am. Ent. Soc., 1875, v, p. 129).

Nine examples, including specimens of both sexes, are known to me. The type is a male and is in my own cabinet. Co-types exist in the collections of Messrs. Blanchard, Fall and Wickham, and in the Museum of Comparative Zoölogy and the National Museum.

It occurs in New Mexico and Arizona.

2. **A. thoracica** n. sp.—Form elongate, scarcely convex, the elytra somewhat flattened on the disk. Color rufopiceous, shining. Head as wide as the thorax at apex; frontal grooves deep, foveiform, not extending anteriorly on to the epistoma; antennæ slender, nearly as long as the head and thorax, ferruginous; palpi ferruginous. Prothorax subcordate, about one-half wider than long, much narrower at base than apex, rather sparsely punctate at apex, more densely at base; apex subtruncate, the anterior angles not prominent; transverse impressions feeble; median line fine, usually abbreviated at each end, sometimes extending to base; basal impressions broad, deep, obsoletely bifoveate; base subtruncate; sides strongly arcuate, very distinctly sinuate behind, the margin narrowly reflexed; hind angles prominent, subacute and rather finely carinate. Elytra subparallel, together scarcely wider than the thorax and less than twice as long as wide, deeply striate; striæ entire, strongly punctate to behind the middle, the scutellar stria long, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals nearly flat; humeri feebly subangulate. Body beneath rufopiceous; sides of prosternum at most obsoletely punctate; metasternal episterna, sides of metasternum and of first and second ventral segments punctured. Legs rufopiceous; middle and hind tarsi with the three basal joints distinctly grooved externally. Length .45-.54 inch; 11.25-13.5 mm.

The males have the middle tibiæ normally dentate on the inner side.

Most nearly related to *pterostichina*, but readily distinguishable by several characters, among which the different color, smaller size, thorax sinuate for a much longer distance in front of the hind angles, and lack of distinct punctuation on the sides of the prosternum may be mentioned, as well as the normally dentate middle tibiæ of the males. It seems to lead towards *blanchardi* and *jacobina*.

The number of setigerous punctures along the inner margin of the middle and hind femora is not constant in this species. In most specimens there are either two or three on each femur, but as many as five have been seen in one specimen, while in several the number is different on the two sides.

The type is from Colorado Springs, Colorado, is a male, and is in my own collection. Cotypes occur in the National Museum and Museum of Comparative Zoölogy, as well as in the collections of Prof. F. H. Snow and Mr. Wickham.

It is known to me from southern Wyoming, Colorado Springs and Buena Vista, Colorado, New Mexico, Holbrook, Arizona, and Nevada. A specimen has also been seen labelled "North-west Territories of Canada."

A. blanchardi n. sp.—Form and color nearly as in *jacobina* Lec. Thorax longer in proportion to its width, being about one-half wider than long, more strongly constricted behind and less densely punctured at base and apex, with the basal impressions distinctly bifoveate; side margin narrower; transverse impressions feeble, median line distinct, abbreviated in front; hind angles prominent, rectangular and acutely carinate. Elytra together scarcely wider than the thorax and nearly twice as long as wide, striate; striæ entire and distinctly punctate to behind the middle, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals flat; humeri subangulate. Metepisterna impunctate or with a few sparse punctures. Legs rufous or piceo-rufous; middle and posterior femora with two or three setigerous punctures along the inner margin; two basal joints of the middle and hind tarsi grooved on the outer side. Length .42–.50 inch; 10.5–12.5 mm.

In the above brief description I have indicated the salient points of difference between this species and *jacobina*, with which it has been confused in collections. The thoracic differences, the grooved basal joints of the middle and hind tarsi and the different number of setigerous punctures of the femora serve to separate it quite readily from the latter species.

The middle tibiæ of the males are distinctly bidentate, the upper tooth being much the more prominent and situated about the middle, the lower about midway between it and the apex.

It is with pleasure that I dedicate this species to my friend Mr. Frederick Blanchard, of Tyngsboro, Mass., as a slight token of regard and of gratitude for assistance and many favors.

Over twenty-five specimens have been studied. The type, which is a male, is in my own cabinet and is from Provo, Utah. Cotypes are to be found in the Museum of Comparative Zoölogy, the National Museum, and in the collections of Messrs. Blanchard, Bowditch, Fall, Liebeck and Wickham.

It occurs in Nebraska, Wyoming, Colorado, New Mexico, Utah, Nevada and eastern California.

4. **A. jacobina** Lec.—Form moderately elongate, feebly convex, the elytra more or less flattened on the disk. Color piceous or nearly black, the surface shining in the males, finely alutaceous in the females. Head nearly as wide as the thorax at apex; frontal grooves short, not extending forward on to the epitoma; antennæ slender, nearly as long as the head and thorax, ferruginous; palpi ferruginous. Prothorax nearly twice as wide as long, subcordate, slightly

narrower at base than apex, usually distinctly punctured at base and apex, rarely feebly so at apex; apex feebly emarginate, the anterior angles rounded, not prominent; transverse impressions rather feeble; median line abbreviated in front; basal impressions broad, deep, bifoveate, the foveæ subconfluent; base subtruncate; sides arcuate, sinuate in front of the hind angles, which are rectangular and strongly carinate; margin wider than in *blanchardi* and translucent. Elytra together scarcely wider than the thorax and less than twice as long as wide, deeply striate; striæ entire, punctate nearly to apex, less deeply behind the middle, the scutellar stria long, the eighth with the row of ocellate punctures rather widely interrupted at middle; intervals feebly convex; humeri feebly subangulate. Body beneath piceous or nearly black; meso- and metasternal episterna and sides of metasternum rather sparsely punctured. Legs dark rufous or rufopiceous, the inner margin of the middle and hind femora with four or five setigerous punctures; tarsi not grooved on the outer side. Length .45–.50 inch; 11.25–12.5 mm.

In the males the middle tibiæ are normally dentate.

This species agrees with *stupida* Lec. in the number of setigerous punctures of the femora, differing from it by the thorax being more narrowed behind and by the presence of an inner fovea in the basal impressions thereof. From *blanchardi*, which it closely resembles, it is sufficiently distinct by the characters given in the table.

It occurs along the Pacific Coast from southern California to Washington. I have seen one specimen from Arizona.

5. **A. stupida** Lec.—Form slightly elongate, convex, the elytra flattened on the disk. Color piceous, the elytra rufopiceous (in the type) or piceous. Head scarcely narrower than the thorax at apex; frontal grooves short, deep, not extending anteriorly on to the epistoma; antennæ slender, shorter than the head and thorax, rufous; palpi rufous. Prothorax nearly twice as wide as long, very slightly narrower at base than apex; apex slightly emarginate, the anterior angles rounded, not prominent; transverse impressions obsolete; median line distinct, abbreviated in front; basal impressions small, the inner fovea obsolete, the outer deep, close to the hind angle; base and apex punctate; base truncate; sides with the margin narrowly reflexed, arcuate, sinuate immediately in front of the hind angles, which are rectangular, slightly prominent and carinate, the carina rather broad. Elytra together scarcely wider than the thorax, more than one-half longer than wide, deeply striate; humeri rounded; striæ entire, distinctly punctate to behind the middle, the scutellar stria moderate, the eighth with the row of ocellate punctures widely interrupted at middle; intervals slightly convex. Body beneath rufopiceous; meso- and metasternal episterna and sides of metasternum and of first two ventral segments sparsely punctate. Legs dark rufous; middle and hind femora with four or five setigerous punctures along the inner margin; tarsi not grooved externally. Length .48–.50 inch; 12–12.5 mm.

Most nearly allied to *jacobina*, from which it differs by the thorax being less narrowed behind and the complete absence of the inner fovea

of the basal impressions. It is worthy of note that the number of setigerous punctures along the inner margin of the femora is the same in the two species.

The males have the middle tibiæ normally dentate.

It is rare in collections. The seven specimens known to me are all from California. Of these, the type is from Sacramento and one of the others from San Diego.

6. **A. bowditchi** n. sp.—Elongate, feebly convex, the elytra slightly flattened on the disk. Color black, shining, the females more or less alutaceous. Head slightly narrower than the thorax at apex; frontal grooves short, deep, anteriorly not extending on to the epistoma; antennæ shorter than the head and thorax, slender, dark rufous; palpi dark rufous. Prothorax subcordate, about one-half wider than long, slightly narrower at base than apex, more or less coarsely punctate at apex, more densely so at base; apex feebly emarginate; transverse impressions feeble or nearly obsolete; median line distinct, abbreviated in front; basal impressions broad, deep, distinctly bifoveate, the inner fovea coarsely, often densely, punctate, the outer usually impunctate or less densely punctured than the inner; sides with the margin narrowly reflexed, arcuate, sinuate behind; base truncate; hind angles rectangular and acutely carinate. Elytra striate, together slightly wider than the thorax and rather more than one-half longer than wide; striæ entire, distinctly punctate to behind the middle, the outer somewhat less deep and more finely punctured, scutellar stria moderately long, eighth with the row of ocellate punctures broadly interrupted at middle; intervals flat or nearly so. Body beneath dark piceous or nearly black, shining, impunctate. Legs dark piceous or nearly black; middle and posterior femora with two setigerous punctures along the inner margin; tarsi not grooved on the outer side. Length .48–.55 inch; 12–13.75 mm.

In the males the middle tibiæ are normally dentate on the inner side, the upper tooth being slightly longer than the lower and situated about the middle, the lower about midway between it and the apex.

A very well marked and easily recognizable species. It is subject to some variation in the punctuation of the thorax. Some specimens have the apex with a few coarse punctures, while the outer basal impression is impunctate. In the other extreme the thorax is coarsely and moderately densely punctured at apex, although less densely so than at base, while the outer fovea of the basal impressions is only slightly more sparsely punctate than the inner. The two forms are connected by numerous intergrades.

I take pleasure in assigning the above name as a token of regard and gratitude, and in memory of the many pleasant hours I have passed in the company of my friend Mr. Frederic C. Bowditch.

The type is a male and is in my own collection. It is from Phoenix, Ariz. Cotypes exist in the collections of Messrs. Blanchard, Bowditch, Fall and Wickham, and in the National Museum and Museum of Comparative Zoölogy.

Specimens have been seen from Phoenix, Arizona; Albuquerque and Coolidge, New Mexico; Utah; La Junta, Colorado, and El Paso, Texas.

7. **A. adstricta** Putz.—Elongate, convex. Color piceous or nearly black, shining, the females finely alutaceous. Head as wide as the thorax at apex; frontal grooves short, moderately deep, not extending forward on to the epistoma; antennæ nearly as long as the head and thorax, slender, ferruginous; palpi rufous. Prothorax about one-half wider than long, widest in front of middle, subcordate, as wide at base as apex, impunctate or very sparsely punctured at apex, punctate at base; apex emarginate, the anterior angles moderately prominent, rounded; median line distinct, abbreviated for a short distance in front; transverse impressions moderate; basal impressions deep, bifoveate, punctate; base emarginate; sides strongly arcuate, the margin narrowly reflexed, suddenly and deeply sinuate immediately in front of the hind angles, which are prominent, acute and acutely carinate. Elytra together scarcely wider than the thorax and nearly twice as long as wide, subparallel, deeply striate: humeri scarcely subangulate; striæ very distinctly punctate, more finely toward the apex, the scutellar stria moderate, the eighth with the row of ocellate punctures moderately widely interrupted at middle; intervals slightly convex. Body beneath rufopiceous or piceous; meso- and metasternal episterna, sides of metasternum and of first two ventral segments sparsely punctured. Legs rufous; posterior femora with two setigerous punctures along the inner margin; tarsi not grooved on the outer side. Length .45–.54 inch; 11.25–13.5 mm.

The middle tibiæ are normally dentate in the males.

Very closely allied to *laticollis* Lec., from which it differs by its more elongate form. The thorax is more deeply emarginate at base, and, as a result, the hind angles are acute and more prominent. The striæ of the elytra are usually more strongly punctured. Extreme forms of the two species are often difficult to separate.

As is the case in both *laticollis* and *carinata*, the number of setigerous punctures along the inner margin of the middle femora is not constant. These are either two or three. When three are present, the two nearest the base of the femur are usually placed near together and are shorter than the one nearest the apex. In some specimens examined there are two on one femur and three on the other.

It is known to me from Montana, Colorado, Utah, Arizona and New Mexico.

8. **A. laticollis** Lec.—Nearly oblong, rather broad, slightly convex, the elytra slightly flattened on the disk. Color varying from piceous to nearly black, shining, the females more or less alutaceous. Head nearly as wide as the thorax at apex; frontal grooves short, anteriorly not extending on to the epistoma; antennæ slender, shorter than the head and thorax, rufous; palpi rufous. Prothorax subquadrate, more than one-half wider than long, as wide at base as apex, distinctly emarginate at apex, slightly so at base, the anterior angles prominent, strongly rounded; apex varying from sparsely to scarcely perceptibly punctate; base punctate; transverse impressions moderate; median line distinct, abbreviated in front; basal impresssion broad, deep, bifoveate, the foveæ punctured; sides strongly arcuate, strongly sinuate behind, the margin narrowly reflexed; hind angles subacute and acutely carinate. Elytra together very slightly wider than the thorax and less than twice as long as wide, oblong-ovate, deeply striate; striæ punctate to behind the middle, the scutellar stria moderately long, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals nearly flat. Body beneath piceous, the inflexed portion of the elytra usually dark rufous; sides of metasternum, metasternal episterna and sides of first two ventral segments sparsely or scarcely at all punctate. Legs dark rufous; two setigerous punctures along the inner margin of the hind femora; tarsi not grooved externally. Length .45–.57 inch; 11.25–14.25 mm.

In the males the inner side of the middle tibiæ is normally dentate.

One of our largest species. It is very closely allied to *adstricta* and *carinata*. From the former it differs by its less convex and less elongate form and by the form of the thorax, of which the hind angles are less acute. From *carinata*, on the other hand, it differs by the sides of the thorax being more strongly rounded and more distinctly sinuate in front of the hind angles, the thorax is less deeply emarginate at apex and more distinctly so at base than in the latter species, while it is less deeply emarginate at base than in *adstricta*. The hind angles are more acute and more prominent than in *carinata*, and the form usually slightly less elongate. The three species are very difficult to define.

Specimens have been seen from Manitoba, Assiniboia, Nebraska, North Dakota, Colorado, Wyoming, Montana, Utah, Arizona and New Mexico.

9. **A. carinata** Lec.—Nearly oblong, slightly elongate, feebly convex, the elytra slightly flattened on the disk. Color piceous or rufopiceous, shining, the females slightly alutaceous. Head scarcely narrower than the thorax at apex; frontal grooves short, moderately deep, not extending on to the epistoma; antennæ slender, scarcely as long as the head and thorax, rufous; palpi rufous. Prothorax about one-half wider than long, subquadrate, as wide at base as apex, sparsely punctate at apex and more densely so at base; apex very distinctly emarginate, the anterior angles rounded, moderately prominent; transverse impressions feeble; median line fine, distinct, abbreviated in front; basal impres-

sions broad, deep, bifoveate, the foveæ subconfluent, punctate; sides with the margin distinctly reflexed, moderately rounded, rather feebly sinuate for a short distance in front of the hind angles, which are rectangular and acutely carinate. Elytra subparallel, together slightly wider than the thorax and less than twice as long as wide, deeply striate; striæ distinctly punctate to behind the middle, the scutellar stria moderately long, the eighth with the row of ocellate punctures widely interrupted at middle; intervals nearly flat. Body beneath piceous or rufopiceous, meso- and metasternal episterna, sides of metasternum and of the first two ventral segments punctate. Legs rufous or rufotestaceous; hind femora with two setigerous punctures along the inner margin; tarsi without grooves on the outer side. Length .45-.55 inch; 11.25-13.75 mm.

The males have the middle tibiæ normally dentate.

Resembles *laticollis* very closely, and, although typical examples of each are readily distinguishable, many specimens occur which are very nearly intermediate between the two. As in that species and in *adstricta* the middle femora have two or three setigerous punctures along the inner margin, the number differing sometimes on the femora of the same individual.

Its range of distribution is nearly the same as that of *laticollis*. It occurs in Nebraska, Kansas, North and South Dakota, Montana, Wyoming, Colorado and Utah.

10. **A. rufimana** Kirby.—Form very elongate, nearly parallel, slightly convex, the elytra slightly flattened on the disk. Color varying from nearly black to piceous or rufopiceous, the elytra often with more or less metallic lustre. Head nearly as wide as the thorax at apex; frontal grooves distinct, short, not extending on to the epistoma; antennæ slender, nearly as long as the head and thorax, ferruginous; palpi ferruginous. Prothorax subcordate, more than one-half wider than long, as wide at base as apex, widest slightly in front of the middle, impunctate at apex, distinctly punctate at base, more or less transversely wrinkled along the median line; apex emarginate, the anterior angles rounded; transverse impressions feeble; basal impressions broad, deep, distinctly bifoveate, punctate; base feebly emarginate; sides with the margin narrowly reflexed, arcuate, sinuate for some distance in front of the hind angles, which are prominent, rectangular and acutely carinate. Elytra together slightly wider than the thorax, about twice as long as wide, nearly parallel, deeply striate; striæ entire, distinctly punctate to behind the middle, the scutellar stria moderately long, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals feebly convex; humeri scarcely rounded. Body beneath piceous or rufopiceous; meso- and metasternal episterna and sides of metasternum and of the first two ventral segments impunctate or at most sparsely punctured. Legs ferruginous; middle and hind femora with two setigerous punctures along the inner margin; tarsi not grooved externally. Length .45-.50 inch; 11.25-12.5 mm.

The teeth on the middle tibiæ of the males are well marked, the upper about the middle, the lower about midway between it and the

apex. The surface is shining and the elytra usually have a more or less distinct metallic lustre.

In the females the surface, which is finely alutaceous, is less distinctly or not at all metallic.

From the three preceding species it is distinct by its more parallel form and proportionally longer elytra. From *cylindrica* it is recognizable by the characters given in the table.

Its distribution is distinctly northern. Specimens have been seen from Newfoundland, Hudson Bay, Ft. Simpson, Great Slave Lake, Alberta, Assiniboia, Manitoba, the north shore of Lake Superior, Bayfield, Wisconsin, Spirit Lake, Iowa, Volga, South Dakota, Montana, Wyoming and Greeley, Colorado.

11. **A. cylindrica** Lec.—Form nearly oblong, elongate, convex. Color piceous or nearly black, shining. Head as wide as the thorax at apex; frontal grooves moderately deep, anteriorly not extending on to the epistoma; antennæ slender, scarcely as long as the head and thorax, rufous; palpi rufous. Prothorax subquadrate, less than one-half wider than long, as wide at base as apex, widest at middle, slightly emarginate at apex, subtruncate at base; anterior angles rounded, slightly prominent; apex impunctate; base punctate; transverse impressions nearly obsolete; median line fine, entire, or but slightly abbreviated in front; basal impressions deep, very distinctly bifoveate; sides arcuate nearly to base, sinuate immediately in front of the hind angles, which are rectangular, slightly prominent and carinate. Elytra together scarcely wider than the thorax and less than twice as long as wide, convex, deeply striate; striæ entire, finely punctate to behind the middle, the scutellar stria long, the eighth with the row of ocellate punctures very widely interrupted at middle; intervals slightly convex. Body beneath piceous or rufopiceous; metasternal episterna, sides of metasternum and of the first two ventral segments sparsely punctured. Legs rufous or rufopiceous; inner margin of the middle and posterior femora with two setigerous punctures; posterior tarsi with the three basal joints slightly grooved on the outer side. Length .37–.44 inch; 9.25–11 mm.

In the males the upper tooth of the middle tibiæ is distinctly below the middle and prominent; the lower tooth is small and situated about half way between it and the apex.

The females have the surface finely alutaceous.

Its form is more convex than that of *rufimana*, with the elytra at most scarcely flattened on the disk. The carina at the hind angles of the thorax is less acute than in *rufimana*. The three basal joints of the hind tarsi are grooved on the outer side as in *eschscholtzi* and *melanogastrica*, and by this character, as well as by its form and the less acutely carinate hind angles of the thorax, it seems to lead towards these last named species.

It is known to me from Labrador, Newfoundland, the Magdalen Islands, Winnipeg, Manitoba, Slave Lake, Hudson Bay and from altitudes of 8,000–10,000 feet in the Rocky Mountains of Colorado.

12. **A. hudsonica** n. sp.—Nearly parallel, elongate, feebly convex. Piceous or nearly black, feebly æneous, the elytra very finely alutaceous. Head scarcely narrower than the thorax at apex; frontal grooves short, not extending forward on to the epistoma; antennæ slender, nearly as long as the head and thorax, rufotestaceous; palpi rufotestaceous. Prothorax subquadrate, about one-half wider than long, as wide at base as apex, with a few scattered punctures each side at apex, distinctly punctate at base; apex slightly emarginate; sides arcuate, distinctly but not strongly sinuate in front of base, which is nearly truncate; anterior transverse impression distinct, the posterior nearly obsolete; median line abbreviated in front; basal impressions deep, punctate, very distinctly bifoveate, the inner fovea longer than the outer; hind angles rectangular, obtusely carinate. Elytra together not wider than the thorax and about twice as long as wide, flattened on the disk, striate; humeri rounded; striæ entire, punctate nearly to apex, the scutellar stria moderately long, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals flat. Body beneath piceous, sides of metasternum and meso- and metasternal episterna sparsely punctate. Legs rufous; middle and posterior femora with two setigerous punctures along the inner margin; hind tarsi with the two basal joints feebly grooved on the outer side. Length .33–.35 inch; 8.25–8.75 mm.

In the males the teeth of the middle tibiæ are much nearer the apex than usual, the upper being situated about two-thirds from the base, the lower about midway between it and the apex.

The form somewhat recalls that of *rufimana*, but the hind angles of the thorax are obtusely carinate, the posterior tarsi grooved externally and the size smaller, while the position of the teeth of the middle tibiæ is also different.

Described from three males from Ungava Bay, Hudson Bay Territory (Collection U. S. National Museum).

13. **A. eschscholtzi** Chaud.—Nearly oblong, moderately elongate, slightly convex. Color black, the elytra usually piceous; surface slightly shining in the males, alutaceous in the females. Head nearly as wide as the thorax at apex; frontal grooves short, deep, not prolonged on to the epistoma; antennæ slender, shorter than the head and thorax, the first two joints rufous, the outer ones darker; palpi rufous. Prothorax about one-half wider than long, as wide at base as apex, subquadrate, punctate at base and apex; apex slightly emarginate, the anterior angles rounded; transverse impressions feeble; median line distinct, abbreviated in front; basal impressions broad, deep, bifoveate, the foveæ slightly oblique, the inner longer than the outer; base truncate; sides with the margin very narrowly reflexed and not translucent, arcuate, sinuate in front of the hind angles, which are rectangular, slightly prominent and obtusely carinate. Elytra slightly flattened on the disk, subparallel, together very slightly wider than

the thorax and more than one-half longer than wide, deeply striate; humeri rounded; striæ punctate, the punctures becoming obsolete toward the apex, entire, the scutellar stria moderately long, the eighth with the row of ocellate punctures widely interrupted at middle; intervals nearly flat. Body beneath dark piceous or black; sides of metasternum, meso- and metasternal episterna and sides of first two ventral segments punctate. Legs varying from nearly black to rufopiceous; middle and hind femora with two setigerous punctures along the inner margin; three basal joints of the posterior tarsi feebly grooved on the outer side. Length .38–.42 inch; 9.5–10.5 mm.

The males have the middle tibiæ normally dentate.

This species approaches *melanogastrica* very closely, and, indeed, seems doubtfully distinct. The chief points of difference are afforded by the prothorax, which is slightly less distinctly emarginate at apex in the present species, with the side margin narrower and not translucent and the foveæ of the basal impressions slightly oblique. The antennæ differ slightly in color, while the elytra are usually paler in *melanogastrica* than in *eschscholtzi*.

It occurs in Alaska and Kamchatka.

14. **A. melanogastrica** Dej.—Form nearly as in *eschscholtzi*. Color dark piceous or black, the elytra usually brownish. Head nearly as wide as the thorax at apex; frontal grooves short, moderately deep, not extending anteriorly on to the epistoma; antennæ slender, slightly shorter than the head and thorax, rufous; palpi rufous. Prothorax subquadrate, about one-half wider than long, as wide at base as apex, punctate at base and more sparsely so at apex; apex emarginate, the anterior angles rounded; transverse impressions nearly obsolete; median line fine, abbreviated in front; basal impressions broad, deep, bifoveate, the foveæ perpendicular to the base, the inner longer than the outer; base truncate; sides with the margin narrowly reflexed but distinctly translucent, rounded, slightly sinuate in front of the hind angles, which are rectangular, slightly prominent and obtusely carinate. Elytra together slightly wider than the thorax and less than twice as long as wide, subparallel, deeply striate; humeri rounded; striæ distinctly punctate, obsoletely so at apex; intervals nearly flat; inflexed portion of the elytra somewhat paler. Body beneath nearly black; meso- and metasternal episterna and sides of metasternum and of the first two ventral segments punctate. Legs usually rufous, varying to piceorufous; middle and hind femora with two setigerous punctures along the inner margin; three basal joints of the posterior tarsi grooved externally. Length .38–.44 inch; 9.5–11 mm.

In the males the middle tibiæ are normally dentate on the inner side.

Very closely allied to the preceding, from which it differs by only a few characters of doubtful value. The prothorax is slightly more deeply emarginate at apex, with the side margin, although narrow, wider than in *eschscholtzi* and translucent, while the foveæ of the

basal impressions are not oblique. The elytra are usually brownish in color, although in a few specimens seen they are not paler than in the last named species. The antennæ are rufous, and the legs usually so, though sometimes piceorufous.

Like *eschscholtzi,* it occurs in Alaska and Kamchatka.

15. **A. brunnipennis** Dej.—Form nearly oblong, elongate, convex. Color black, at most scarcely æneous, the elytra often piceous or brown; surface shining in the males, finely alutaceous in the females. Head nearly as wide as the thorax at apex; frontal grooves short, distinct, anteriorly not extending on to the epistoma; antennæ slender, shorter than the head and thorax, piceous, the first two joints usually paler; palpi piceous, usually paler at the extreme tip. Prothorax about one-half wider than long, as wide at base as apex, impunctate or rarely with a few scattered punctures at apex, more or less sparsely punctured at base, usually more or less transversely wrinkled along the median line; apex emarginate, the anterior angles rounded; transverse impressions moderate or feeble; median line fine, entire or abbreviated for a short distance in front; basal impressions broad, deep, more or less coarsely punctate, bifoveate, the inner fovea longer than the outer; base truncate; sides with the margin narrowly reflexed, arcuate from apex to base or sometimes oblique for a short distance in front of the hind angles, which are obtuse and obtusely carinate. Elytra together scarcely wider than the thorax and less than twice as long as wide, striate; striæ entire, punctate to behind the middle, the scutellar stria moderate, the eighth with the row of ocellate punctures widely interrupted at middle; intervals rather broad, flat or nearly so; humeri rounded. Body beneath black; meso- and metasternal episterna, sides of metasternum and of the first two ventral segments impunctate or at most sparsely punctate. Legs varying in color from black to nearly rufous, usually piceous or rufopiceous; inner margin of the middle and hind femora with two setigerous punctures; posterior tarsi with the three basal joints not or at most very feebly grooved on the outer side. Length 33-.45 inch; 8.25-11.25 mm.

In the males the middle tibiæ are normally dentate.

This species, as above defined, includes what have been known heretofore in collections in this country, at least, as *A. brunnipennis* Dej. and *A. hyperborea* Dej. The former name has been retained, as I regard it as more than probable that the species known as *hyperborea* in American collections is not the *hyperborea* of Dejean. The original description does not apply to the present species, while Dejean's remarks, as well as those of Putzeys, who had the type before him, seem to refer to a different species.

As might be expected from its wide geographical range, considerable variation is exhibited, and several forms might be selected, which, if studied from uniques or from a very small series of specimens, would doubtless be regarded as distinct species. These, how-

ever, intergrade in the large series before me. One of the more important variations is to be seen in the prothorax, the sides of which are in some examples arcuate from apex to base, the hind angles being very obtuse or almost rounded, while in others the sides are arcuate to behind the middle, from thence oblique to the hind angles, or, in one or two specimens, with a very feeble trace of sinuation immediately in front of them, the angles being obtuse and not prominent. The elytral striæ vary in depth as well as in the coarseness of their punctation, while the intervals vary from flat to feebly convex. The color varies from uniformly black to bicolored, the head and thorax being black and the elytra more or less brownish, sometimes uniformly reddish-brown, sometimes with the sutural and lateral margins dark, and sometimes piceous, only slightly paler than the head and thorax. Much the same range of variation may be observed in the color of the legs, as stated in the description, while the hind tarsi vary from very feebly to not at all grooved on the outer side. These variations are so intermingled that it has been found impossible to separate even varieties by characters of any constancy.

The species is most closely related to *eschscholtzi* and *melanogastrica*, but is readily distinguishable from both by the obtuse hind angles of the thorax.

Nearly three hundred examples have been studied.

It occurs in Labrador, on Mt. Katahdin, Maine, Mt. Washington, New Hampshire, Mt. Mansfield, Vermont, in the Hudson Bay region, at high altitudes in the Rocky Mountains of Colorado, in Alaska, extending northward to Point Barrow, and on St. George's Island and St. Paul's Island in Behring Sea.

16. **A. infausta** Lec.—Form oblong, moderately elongate, convex. Color nigropiceous. Head scarcely narrower than the thorax at apex; frontal grooves short, not extending forward on to the epistoma; antennæ slender, scarcely as long as the head and thorax, rufous; palpi rufous. Prothorax subquadrate, about one-half wider than long, slightly wider at base than apex, distinctly punctate at base and apex; apex emarginate, the anterior angles rounded, moderately prominent; base feebly emarginate; transverse impressions obsolete; median line entire; basal impressions broad, deep, bifoveate, the foveæ punctate; sides with the margin narrowly reflexed, arcuate, sinuate in front of the hind angles, which are rectangular and acutely carinate. Elytra convex, scarcely flattened on the disk, together scarcely wider than the thorax and less than twice as long as wide, striate; striæ distinctly punctate, more finely toward the apex, the scutellar stria moderately long, the eighth with the row of ocellate

punctures widely interrupted at middle; intervals flat, somewhat wider than usual. Body beneath piceous; sides of metasternum, meso- and metasternal episterna and sides of ventral segments punctate. Legs rufopiceous; middle and posterior femora with two setigerous punctures along the inner margin; the two basal joints of the hind tarsi grooved on the outer side. Length .44 inch; 11 mm.

The above is from LeConte's type, which was received from Motschulsky under the name "*rufimanus.*" It resembles most nearly *eschscholtzi*, but is abundantly distinct by the characters given above.

Under his description LeConte gives the locality as "Russian America," but there is no locality label attached to the specimen in question.

17. **A. elongata** Lec.—Elongate, oblong-ovate, slightly convex, the elytra flattened on the disk. Color varying from pale rufopiceous to piceous, shining. Head as wide as the thorax at apex; frontal grooves short, not extending forward on to the episterna; eyes rather small; antennæ nearly as long as the head and thorax, ferruginous or rufopiceous, slender; palpi rufous or rufopiceous. Prothorax subquadrate, slightly wider than long, distinctly wider at base than apex, impunctate at apex, punctate at base; apex slightly emarginate; transverse impressions nearly obsolete; median line distinct, abbreviated at each end; basal impressions bifoveate, the inner fovea longer than the outer; sides with the margin very narrowly reflexed, rounded, obsoletely sinuate immediately in front of the hind angles, which are slightly obtuse and very obtusely carinate; base truncate. Elytra oblong-oval, elongate, together distinctly wider than the thorax, striate; striæ entire, finely punctate to behind the middle, the scutellar stria shorter than usual, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals flat. Body beneath of the same color as above; meso- and metasternal episterna and sides of metasternum sparsely and sides of first two ventral segments more densely punctured. Legs varying from rufous to piceous; middle and hind femora with two setigerous punctures along the inner margin; basal joint of middle and hind tarsi feebly grooved externally. Length .44-.46 inch; 11-11.5 mm.

In the males the middle tibiæ are distinctly bidentate, the teeth being normally placed.

A very distinct species, differing markedly from our other Cyrtonoti in form, and bearing considerable resemblance to the Siberian *A. fodinæ*. It is readily recognizable by the characters given.

It seems to me by no means improbable that this may be *hyperborea* Dej., but it would be necessary to see Dejean's type before treating it as such. Beneath his description Dejean compares *hyperborea* with *fodinæ*, and states that it should be placed next to

that species, while there is a specimen of *elongata* in the LeConte collection labelled in Dr. J. L. LeConte's handwriting "A. (C.) hyperborea Dej. f. Putzeys."

It is known to me from Lake Superior, Ungava Bay and Fort Simpson, Canada, and Labrador.

18. **A. pennsylvanica** Nobis.—Form nearly oblong, moderately convex. Color piceous or nearly black, shining, the inflexed portion of the elytra usually paler. Head slightly narrower than the thorax at apex; frontal grooves short, deep, not extending on to the episterna; antennæ slender, shorter than the head and thorax, rufous; palpi rufous. Prothorax subquadrate, less than one-half wider than long, distinctly wider at base than apex, widest slightly in front of middle, impunctate at apex, punctate at base; apex emarginate, the anterior angles rounded, slightly prominent; transverse impressions feeble; median line distinct, slightly abbreviated in front; basal impressions broad, deep, bifoveate, the foveæ coarsely punctured and more or less confluent; base truncate; sides with the margin narrowly reflexed, arcuate, sinuate in front of the hind angles, which are rectangular and carinate. Elytra together scarcely wider than the thorax and more than one-half longer than wide, deeply striate; humeri subangulate; striæ deeply punctate, more finely toward the apex, the scutellar stria moderately long, the eighth with the row of ocellate punctures widely interrupted at middle; intervals slightly convex. Body beneath piceous or rufopiceous; meso- and metasternal episterna, sides of metasternum and of the first two ventral segments coarsely punctate. Legs rufous; inner margin of middle and hind femora with two setigerous punctures; tarsi without external grooves. Length .40–.47 inch; 10–11.75 mm.

The middle tibiæ are normally dentate in the males.

The name *fulvipes* assigned to this species by Putzeys being preoccupied (Serville, Fauna France, 1821), that of *pennsylvanica* is proposed in its place.

One of our most easily recognizable species, differing from all the others in our fauna, except *elongata*, by the prothorax very distinctly wider at base than apex, while from the last named it is readily distinguishable by numerous characters mentioned above.

Its distribution is interesting. It is the only species of the subgenus occurring in the more eastern United States south of the Lake Superior region, except at high altitudes. Specimens are known to me from New Jersey, Pennsylvania, District of Columbia, Ohio, Illinois, Tennessee, Alabama, Missouri, Nebraska, Kansas, Iowa, Wyoming, Texas and New Mexico, and also from Ontario, Canada. It was apparently taken in great numbers near Alleghany, Pa., by the late Dr. Hamilton.

19. **A. hæmatopa** Dej.—Elongate, moderately convex. Head and thorax black, in the males more or less æneous, the elytra in that sex green or cupreous with strong metallic lustre, in the females usually very feebly metallic or nearly black; surface shining. Head as wide as the thorax at apex; frontal grooves long, deep, extending forward on to the epistoma; antennæ shorter than the head and thorax, thickened, piceous or rufopiceous; palpi rufous or rufopiceous. Prothorax about one-half wider than long, subquadrate, widest slightly in front of the middle, as wide at base as apex, impunctate at apex, often more or less transversely wrinkled along the median line; apex feebly emarginate; transverse impressions moderate or sometimes feebly impressed; median line distinct, abbreviated in front; basal impressions broad, deep, rather finely and sparsely, sometimes obsoletely punctate, distinctly bifoveate; sides arcuate from apex to base, the margin distinctly reflexed, slightly more widely toward the base; base truncate; hind angles obtuse, not prominent, carinate. Elytra together slightly wider than the thorax and more than one-half longer than wide, subparallel, slightly flattened on the disk, moderately deeply striate; humeri rounded; striæ entire, usually obsoletely punctate, rarely distinctly so, the scutellar stria moderate, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals slightly convex. Body beneath black or dark piceous, rarely feebly æneous in very highly colored specimens, impunctate, except the mesosternal episterna which are finely and sparsely punctured. Legs varying from rufous to rufopiceous; middle and hind femora with two setigerous punctures along the inner margin; basal joint of the hind tarsi slightly grooved externally. Length .40–.52 inch; 10–13 mm.

In the males the middle tibiæ are only feebly bisinuate on the inner side near the apex.

The females are larger, more robust and less shining than the males, and with at most but feeble metallic lustre.

The name *hæmatopa* Dej. has priority over that of *similis* Kirby, by which the species has been generally known.

Readily distinguishable from all the other North American species of the subgenus known to me by three structural characters of importance, *i. e.*, the extension forward of the frontal grooves on to the epistoma, the thickened antennæ, and the middle tibiæ of the males feebly bisinuate within near the apex. The middle tibiæ are not dentate in that sex, and it is often difficult to distinguish the feeble bisinuation, which is apparently the homologue of the teeth occurring in our other species. In color and facies it differs also from our other Cyrtonoti. It is, in many respects, a very aberrant species, and seems to lead toward *Bradytus;* but the posterior tibiæ of the males show no trace of the pubescence characteristic of that subgenus, and the prosternum is not margined at tip. On the whole it seems best placed at the end of the present subgenus.

In distribution it is essentially northern. Specimens are known to me from Labrador; the higher altitudes of Mt. Katahdin, Me., and Mt. Washington, New Hampshire; Ungava Bay and the Hudson Bay territory; the northwest territories of Canada, British Columbia and Alaska.

Subgenus **LEIRONOTUS** Ganglb.

Prothorax distinctly wider in front of base. Prosternum not margined at tip. Apical spur of anterior tibiæ simple. Middle tibiæ not dentate on the inner side in the males. Posterior tibiæ not pubescent on the inner side in the males.

Intermediate in characters between *Cyrtonotus* and *Leiocnemis*, differing from the former by the middle tibiæ simple in both sexes, and from the latter by the prosternum not margined at tip.

But one species occurs in our fauna, which was formerly referred with *avida* to *Leiocnemis*.

20. **A. arenaria** Lec.—Nearly oblong, convex, the elytra flattened on the disk. Color piceous, shining. Head as wide as the thorax at apex; eyes very finely granulate; frontal grooves small, punctiform; antennæ rufous, as long as the head and thorax; palpi rufous, the terminal joint slightly swollen, acuminate toward the tip. Prothorax about one-half wider than long, wider at base than apex, impunctate; apex emarginate; transverse impressions distinct; median line distinct, abbreviated before and behind; basal impressions linear, the inner fovea distinct, the outer obsolete; base truncate, slightly obliquely so each side; sides with the margin narrowly reflexed, rounded, oblique behind; hind angles slightly obtuse and not carinate. Elytra wider than the thorax, finely striate; striæ entire, impunctate, the scutellar stria obsolete, the eighth with the row of ocellate punctures narrowly interrupted at middle; humeri subangulate; intervals slightly convex. Body beneath piceous, impunctate. Legs rufous; all the femora with two setigerous punctures along the inner margin; tarsi not grooved on the outer side. Length .20–.23 inch; 5–5.75 mm.

The anterior tarsi are more narrowly dilated than in most Amaræ. The males have one, the females two anal setæ.

A very distinct little species, easily recognizable from the others in our fauna. It seems subject to but slight variation. In a few specimens examined a faint trace of the scutellar stria has been observed, usually, however, on but one elytron.

The form of the palpi is different from that of any of our other species of the genus, and resembles, judging from descriptions, that of the European *A.* (*Leironotus*) *glabrata*.

It is apparently northern in its distribution. Specimens have

been seen from Canada, Maine, the White Mountains of New Hampshire, Tyngsboro, Lowell and Boston, Massachusetts, Michigan and Lake Superior.

Subgenus **LEIOCNEMIS** Zimm.

Prothorax wider in front of base. Prosternum margined at tip. Apical spur of anterior tibiæ simple. Males with the middle tibiæ not dentate on the inner side. Posterior tibiæ not pubescent on the inner side in the males.

This subgenus seems to lead from *Cyrtonotus* and *Leironotus* toward *Bradytus*. In our species the prosternum, although margined at tip, is less distinctly so than in *Bradytus, Tricena, Amara* and *Celia*. The males of several exotic species have a punctured area at the middle of the prosternum, but no trace thereof is to be seen in our representative.

Although the European species are fairly numerous, but one occurs within the limits of our fauna.

21. **A. avida** Say.—Form oblong, convex, elytra slightly flattened on the disk. Color dark piceous or nearly black, shining. Head as wide as the thorax at apex; eyes moderately large, rather finely granulate; frontal grooves distinct, not extending forward on to the epistoma; antennæ shorter than the head and thorax, rufous; palpi rufous. Prothorax nearly twice as wide as long, subquadrate, widest in front of middle, as wide at base as apex, sparsely punctate at apex, more densely so at base; apex emarginate; transverse impressions feeble; median line distinct, abbreviated at each end; basal impressions linear, the inner fovea distinct, the outer obsolete; base truncate; sides with the margin narrowly but distinctly reflexed, arcuate, distinctly sinuate in front of the hind angles, which are rectangular, moderately prominent and not carinate. Elytra scarcely wider than the thorax, deeply striate; humeri rounded; striæ entire, punctate, more feebly toward the apex, the scutellar stria moderately long, the eighth with the row of ocellate punctures broadly interrupted at middle; intervals convex. Body beneath black, shining; sides of prosternum sparsely punctate; meso- and metasternal episterna, sides of metasternum and of the first two ventral segments coarsely punctured; all the femora with two setigerous punctures along the inner margin; tarsi not grooved on the outer side.

The males have the anterior tarsi rather narrowly dilated and one anal seta on each side, there being two in the females.

A moderately common and well known species. In facies it most nearly resembles *A.* (*Bradytus*) *exarata* Dej., but is quite readily recognizable by the absence of the outer fovea of the basal impressions of the thorax, as well as by the subgeneric characters. In well preserved males a few fine hairs are usually to be seen on the inner side of the posterior tibiæ, but they are not to be compared

with the true pubescence observable in *exarata*, in spite of the fact that this is less dense in the last named species than in most Bradyti.

Specimens are known to me from Nova Scotia, New Brunswick, Canada, all the New England States, New York, New Jersey, Pennsylvania, the mountains of southwestern Virginia, Michigan, Iowa, Illinois, the north shore of Lake Superior, Manitoba and Colorado.

Subgenus **BRADYTUS** Zimm.

Prothorax wider in front of base. Prosternum margined at tip. Anterior tibiæ with the apical spur simple. Males with the middle tibiæ not dentate on the inner side. Posterior tibiæ distinctly, usually densely pubescent on the inner side in the males.

Distinct from all the subgenera, except *Amara* s. s. and *Tricena*, by the posterior tibiæ distinctly pubescent on the inner side in the males, while from the two latter it is at once distinguishable by the form of the prothorax. From *Cyrtonotus* and *Leironotus* it differs in having the prosternum margined at tip, while it resembles them in having the thorax distinctly wider in front of base. With all but *Cyrtonotus* it agrees in having the middle tibiæ not dentate within in the males, and with all except *Tricena* by the apical spur of the anterior tibiæ not trifid.

The males of all our species in which that sex is known to me, in addition to the secondary character above mentioned, have the anterior tarsi dilated and one anal seta each side, two being present in the females. A secondary sexual character of some importance in classification is also to be observed on the prosternum of several species. This consists of an impression varying from a deep fovea to a shallow punctured area or groove. In at least one species it is entirely wanting.

Our species agree in having all the femora normally bisetose along the inner margin. They may thus be separated:

Scutellar stria long.....2.
Scutellar stria very short or obsolete; form convex; metasternal episterna punctured; males with a shallow oval space, with a few small punctures at middle of prosternum. Length .30-.40 inch.....22. **exarata** Dej.
2. Prosternal side pieces impunctate.....3.
Prosternal side pieces punctate; metasternal episterna punctured.
Viridi, or cupreo-æneous; prothorax nearly twice as wide as long, punctate at base, sides and apex, distinctly emarginate at apex; basal impressions feebly bifoveate; prosternum simple in both sexes. Length .25-.32 inch.....23. **glacialis** Mann.

Dark piceous, faintly æneous; prothorax about one-half wider than long, punctate at base, very feebly emarginate at apex; basal impressions distinctly bifoveate; male unknown. Length .32 inch.

24. **putzeysi** Horn.

3. Metasternal episterna punctate; prothorax about one-half wider than long, emarginate at apex; prosternum with a deep fovea at middle in the males. Length .24–.33 inch.....25. **apricaria** Payk.

Metasternal episterna impunctate.

Prosternum longitudinally sulcate, without punctured area in the males, more feebly in the females. Length .28–.32.

26. **schwarzi** Nobis (*septentionalis* || Lec.).

Prosternum with shallow, sparsely punctured oval space at middle in the males, simple in the females. Length .35–.43 inch.

27. **latior** Kirby.

22. **A. exarata** Say.—Oblong-oval, robust, very convex. Color varying from piceous to black, shining. Head slightly narrower than the thorax at apex; frontal grooves short, triangular, not extending forward on to the episterna; eyes moderate, finely granulate; antennæ as long as the head and thorax, rufous; palpi rufous. Prothorax subquadrate, about one-half wider than long, broadest about the middle, wider at base than apex; apex emarginate, the anterior angles rounded; base feebly bisinuate; median line distinct, abbreviated in front; anterior transverse impression varying from moderately distinct to nearly obsolete, the posterior obsolete or feebly marked at middle; basal impressions broad, coarsely and usually densely punctate, very distinctly bifoveate; sides with the margin narrowly but distinctly reflexed, arcuate, sinuate for a very short distance in front of the hind angles, which are small, acute, slightly prominent and very obtusely carinate. Elytra slightly wider than the thorax, subparallel, deeply striate; striæ deeply and closely punctate, less distinctly toward the apex; scutellar stria usually very short or obsolete or represented by punctures, rarely distinct, though shorter than in our other species of the subgenus; intervals convex. Body beneath piceous or rufopiceous, the abdomen usually slightly paler; prosternum with the sides rather sparsely punctured in front, the side-pieces usually impunctate, rarely with a few scattered punctures; meso- and metasternal episterna, sides of metasternum and of ventral segments coarsely punctate. Legs varying from rufous to rufopiceous. Length .30–.40 inch; 7.5–10 mm.

The males have on the prosternum at middle a small, nearly oval space with a few small punctures. The posterior tibiæ are less densely pubescent on the inner side in that sex than is usual in this subgenus, and the pubescence extends but for a short distance from the apex of the tibia.

Superficially this species resembles most closely *A.* (*Leiocnemis*) *avida* Say, but in addition to the subgeneric characters it differs by several others mentioned above. It also resembles *A. fulva* DeGeer of Europe. From our other species of *Bradytus* it is distinguishable by the characters given in the table.

Immature examples are often pale yellow, and it was doubtless upon one of these that *A. furtiva* Say was based. The variation shown in the punctuation of the prosternal side pieces as well as in the prominence of the scutellar stria shows that great care should be used in basing species solely upon these characters.

It is known to me from Massachusetts, New York, New Jersey, Pennsylvania, District of Columbia, West Virginia, North Carolina, Ohio and Nebraska.

23. **A. glacialis** Mann.—Form oblong-ovate, moderately convex. Color viridi-æneous or cupreo-æneous, shining. Head as wide as the thorax at apex; eyes large, prominent; frontal grooves short, not extending forward on to the epistoma; antennæ less than one-half the length of the body, piceous, the first joint more or less rufous; palpi piceous. Prothorax subquadrate, nearly twice as wide as long, widest slightly in front of the middle, slightly wider at base than apex; apex emarginate, the anterior angles rounded but prominent; median line distinct, entire or slightly abbreviated in front; transverse impressions obsolete; basal impressions shallow, feebly, sometimes obsoletely, bifoveate; surface punctate at base, sides and apex, the disk impunctate; base slightly bisinuate behind; hind angles subacute and slightly prominent, not carinate. Elytra distinctly wider than the thorax, striate, flattened on the disk; striæ entire, distinctly punctate, the punctures becoming obsolete toward the tip; scutellar stria long; intervals flat. Body beneath black; prosternum with the side-pieces punctate; meso- and metasternal episterna, sides of metasternum and of first two ventral segments coarsely punctured. Legs rufous, the tibiæ externally and the tarsi more or less piceous; middle and hind tarsi with the two basal joints grooved on the outer side. Length .25–.32 inch; 6.25–8 mm.

The males have no trace of punctured fovea or groove on the prosternum at middle. In the females the elytra are finely alutaceous.

Originally placed in *Bradytus* by Mannerheim, it was removed to *Cyrtonotus* by Putzeys, where it has since been allowed to remain, although its facies is eminently that of the former subgenus, females only having been known until recently in this country. Putzeys in describing the only specimen (a male) in the Chaudoir collection, refers to the lower tooth of the middle tibia as being more prominent than the upper, and says that the hind tibiæ are glabrous on the inner side. In studying some half dozen or more males in the collection of the National Museum, I have been unable to detect any trace of teeth on the middle tibiæ, while in several specimens, carefully cleaned, a sparse, fine pubescence is plainly discernable on those of the posterior legs. Furthermore, the prosternum is very distinctly margined at the tip, a character entirely unknown in

Cyrtonotus. I have, therefore, no hesitation in restoring it to *Bradytus*.

But slight variation has been observed. This is mainly in the coarseness of the punctuation of the thorax and in the color of the legs, some individuals having them almost entirely rufous, while in others the tibiæ on the outer side and the tarsi are piceous. This variation is indicated by Mannerheim as: "*Var. b.* Cuprea, pedibus rufis, tibiis posticis basis tarsisque omnibus infuscatis."

The type is from Kenai, "Var. b" from Kamchatka, and I have seen specimens from Kenai (LeConte collection), from Ungava Bay, Hudson Bay territory and from Labrador.

24. **A. putzeysi** Horn.

So closely allied to *apricaria* Payk. as to require no special description. In fact, it has been suggested as not improbably a synonym of that species. From the latter, however, it is separable by the coarsely punctured prosternal side pieces. The prothorax is only very feebly emarginate at apex. By the first character it approaches *glacialis* Mann.

But one specimen, Dr. Horn's type, is known to me. It measures .32 inch (8 mm.) in length, is a female and is in the LeConte collection. Beneath his description Horn states it to be a male, but this is without doubt a typographical error. The example referred to not only bears the label "type," but agrees with the description and bears all labels indicating its authenticity, while additional evidence is afforded by the fact that Dr. Horn refers to no secondary male characters, these being mentioned in the same paper in connection with our other species and being of systematic importance in the subgenus *Bradytus*.

It was received by Dr. LeConte from Putzeys as coming from St. Pierre Miquelon, Newfoundland.

25. **A. apricaria** Payk.—Form moderately elongate, oblong-oval, convex, the elytra slightly flattened on the disk. Color dark nigro-piceous or nearly black, sometimes very faintly æneous, shining, the surface very slightly alutaceous in the females. Head scarcely narrower than the thorax at apex; frontal grooves short, not extending forward on to the epistoma; eyes large, finely granulate; antennæ rufous, slightly shorter than the head and thorax; palpi rufous. Prothorax subquadrate, rather more than one-half wider than long, broadest about the middle, wider at base than apex, coarsely punctate at base and usually with a few punctures near the apical margin, the surface more or

less transversely wrinkled along the median line; apex emarginate; median line distinct, abbreviated in front; transverse impressions varying from moderately well marked to nearly obsolete; basal impressions broad, deeply bifoveate; base truncate; sides with the margin narrowly reflexed, rounded, sinuate immediately in front of the hind angles, which, though small, are acute, slightly prominent and obtusely carinate. Elytra slightly wider than the thorax, deeply striate; striæ entire, very distinctly and closely punctate, the punctures becoming evanescent at tip; scutellar stria long; intervals flat or nearly so. Body beneath piceous; prosternum more or less punctured at the sides in front, the prosternal side-pieces impunctate; meso- and metasternal episterna and sides of metasternum and first three ventral segments closely punctate. Legs rufous. Length .24-.33 inch; 6-8.25 mm.

In the males there is a deep oval fovea on the prosternum slightly in front of the middle, while between this and the tip is a short groove, the latter being present also in the females, though less marked than in the males.

But slight variation, besides what is indicated in the description, is shown. A few specimens in the series before me are devoid of punctures near the apex of the thorax. The two basal joints of the middle and hind tarsi sometimes exhibit faint traces of grooves. About fifty specimens have been studied.

It is known to me from the Magdalen Islands, Nova Scotia, Canada, the White Mountains of New Hampshire (occurring at as high an altitude, as 5053 feet, as the Lake of the Clouds on Mt. Washington), Mt. Desert, Maine, Lowell, Tyngsboro, Manchester, Methuen, Brookline, Nantucket and Chicopee, Massachusetts, the Adirondack Mountains, New York, and Newark, New Jersey. It occurs also in Europe and Siberia. To the kindness of Herr Th. Götzelmann I am indebted for examples from Ujpest, Hungary.

26. **A. schwarzi** Nobis.—Form oblong-oval, moderately convex, the elytra slightly flattened on the disk. Color dark piceous or nearly black, with faint æneous lustre, shining, very finely alutaceous in the females. Head scarcely narrower than the thorax at apex; eyes moderately large and prominent; frontal grooves short, not extending forward on to the epistoma; antennæ slightly shorter than the head and thorax, rufous; palpi rufous. Prothorax subquadrate, about one-half broader than long, widest about the middle, slightly wider at base than apex; apex emarginate; median line distinct, slightly abbreviated in front; transverse impressions feeble, the posterior usually obsolete; basal impressions broad, deeply bifoveate, punctate; base truncate; sides with the margin narrowly reflexed, but translucent, slightly rounded in front, oblique behind; angles obtuse, obtusely carinate. Elytra slightly wider than the thorax, striate; striæ entire, punctate to behind the middle, the scutellar stria long; intervals nearly flat. Body beneath piceous, the abdomen tinged with rufous; prosternum and prosternal side-pieces impunctate; mesosternal episterna sparsely punctured

in front; metasternum and metasternal episterna impunctate; sides of first two ventral segments finely and rather sparsely punctured. Legs dark rufous. Length .28-.32 inch; 7-8 mm.

The above name is proposed in place of *septentrionalis* Lec. (1848), the latter being pre-occupied (Curtis, Ann. Mag., 1840, p. 274). I take pleasure in dedicating it to Mr. E. A. Schwarz, by whom most of the specimens in our collections were taken, in acknowledgment of many favors.

In the males the prosternum has no punctured area or fovea, but in lieu thereof a deep groove extending from the tip nearly to the apical margin. This is represented in the females, but is less marked.

But slight variation is shown. As in *apricaria*, the first two joints of the middle and hind tarsi sometimes exhibit faint traces of an external groove.

It seems most nearly related to *latior* Kirby, from which it is separable by the prosternal characters and by its smaller size.

Known only from Lake Superior.

27. **A. latior** Kirby.—Form oblong-oval, moderately elongate, slightly convex, the elytra more or less flattened on the disk. Color dark piceous or black, sometimes slightly æneous; surface very finely alutaceous in the females. Head scarcely narrower than the thorax at apex; frontal grooves short, not extending forward on to the epistoma; eyes moderately large, finely granulate; antennæ slightly shorter than the head and thorax, dark rufous; palpi rufous. Prothorax subquadrate, about one-half wider than long, nearly equally narrowed before and behind, widest about the middle, deeply emarginate at apex; base truncate; anterior transverse impression usually distinct, sometimes nearly effaced, the posterior usually feebly marked at middle; median line distinct, abbreviated in front; basal impressions broad, distinctly bifoveate, punctate, the inner fovea longer than the outer; sides with the margin narrowly reflexed, arcuate, less strongly so behind, rarely obsoletely sinuate in front of the hind angles, which are obtuse, at most but feebly prominent, and very obtusely carinate. Elytra slightly wider than the thorax, subparallel, deeply or moderately deeply striate; striæ entire, varying from distinctly to obsoletely punctate, the punctures becoming evanescent at the sides and towards the tip; scutellar stria long; intervals flat or nearly so. Body beneath dark piceous or nearly black, shining; pro-, meso- and metasterna and side-pieces impunctate; sides of the first two ventral segments sparsely punctured. Legs varying from rufous to rufopiceous or piceous. Length .35-.43 inch; 8.75-10.75 mm.

In the males the prosternum has a shallow, oval, punctured space at middle, sometimes only feebly indicated by a few small punctures.

Our largest and best known species of the subgenus, easily recognizable by the characters given in the table.

It occurs in Canada, the New England States and westward to California, Oregon and British Columbia, extending southward along the Rocky Mountains to southern Colorado.

Subgenus **TRIÆNA** Lec.

Prothorax not wider in front of base. Prosternum margined at tip. Apical spur of anterior tibiæ trifid. Middle tibiæ not dentate on the inner side in the males. Hind tibiæ pubescent on the inner side in the males.

The essential character for the definition of this subgenus is afforded by the structure of the apical spur of the anterior tibiæ, which is trifid in both sexes. Otherwise the characters are as in *Amara* s. s., except that the posterior tibiæ are less densely pubescent on the inner side in the males. The species bear most resemblance to *A. impuncticollis*, and in all but one of those of our fauna the scutellar stria terminates at base in an ocellate puncture. All the femora have two setigerous punctures along the inner margin, and the middle and hind tarsi have the basal joint grooved on the outer side. The number of anal setæ differs in the sexes, being one each in the males, two in the females.

Our species may thus be separated:

Scutellar stria of elytra terminating at base in an ocellate puncture.
Antennæ with the three or four basal joints pale, the outer ones darker.
Legs rufotestaceous.
Prothorax narrowed from base to apex; posterior lateral setigerous puncture nearer the basal than the side margin, hind angles obtuse; fourth joint of antennæ in great part pale. Length .22–.32 inch.
28. **angustata** Say.
Prothorax narrowed from slightly behind the middle to apex, the sides subparallel behind, posterior setigerous puncture equidistant from basal and lateral margins, hind angles sharply rectangular; fourth joint of antennæ in great part piceous.
Sides of body beneath and abdomen smooth; thorax about one-half wider than long, apex emarginate. Length .22–.32 inch.
29. **pallipes** Kirby.
Sides of body beneath and abdomen coarsely, sparsely punctate; thorax less than one-half wider than long, apex feebly emarginate. Length .27–.34 inch.....30. **longula** Lec.
Legs in front part piceous; hind angles of thorax subrectangular. Length .27.–.34 inch.....31. **scitula** Zimm.
Antennæ and legs entirely rufotestaceous; middle lobe of apical spur of anterior tibiæ obtuse at tip; thorax with the posterior lateral setigerous puncture nearer the basal than the side margin. Length .32–.34 inch.
32. **belfragei** Horn.
Scutellar stria of elytra without ocellate puncture at base; legs rufopiceous. Length .29–.32 inch.....33. **afoveolata** n. sp.

28. **A. angustata** Say.—Form oval, convex. Color æneous, shining. Head scarcely narrower than the thorax at apex; frontal grooves very short; antennæ slightly shorter than the head and thorax, slender, the first three joints and the greater part at least of the fourth rufotestaceous, the outer joints darker; palpi testaceous, the last joint darker. Prothorax about one-half wider than long, narrowed from immediately in front of base to apex; apex feebly emarginate; sides rounded, more strongly in front, the margin narrowly reflexed, the posterior lateral setigerous puncture nearer the basal than the side margin; transverse impressions obsolete; median line distinct, abbreviated before and behind; outer basal fovea obsolete, the inner obsolete or feebly marked; base truncate, the basal margin extending about three-fourths the distance from side to middle; hind angles obtuse, rounded, not carinate. Elytra together not wider than the thorax, narrowed behind, striate; striæ entire, deeper behind, the scutellar stria terminating at base in an ocellate puncture, the eighth with the row of ocellate punctures interrupted at middle; intervals nearly flat. Body beneath black, shining, impunctate. Legs testaceous; apical spur of anterior tibiæ with the inner lobe acute. Length .22-.32 inch; 5.5-8 mm.

Most nearly allied to *pallipes*, but distinct by the characters given above. Its form is more convex than in that species, and the elytra, which are not wider than the thorax, are more acuminate at tip.

The base of the thorax varies from impunctate to sparsely punctured. The elytral striæ also vary, and, while impunctate in the majority of specimens, are occasionally sparsely punctate at base.

It occurs from Canada and the New England States southward to Virginia and westward to Kansas.

29. **A. pallipes** Kirby.—Nearly oval, slightly convex. Æneous or nigro-æneous. Head as wide as the thorax at apex; frontal grooves short; antennæ slender, nearly as long as the head and thorax, piceous, the three basal joints and usually the base of the fourth rufotestaceous; palpi rufotestaceous. Prothorax about one-half wider than long, narrowed from slightly behind the middle to apex; apex emarginate; sides arcuate in front, subparallel behind, the margin narrowly reflexed, the posterior setigerous puncture in the hind angle and equidistant from basal and lateral margins; base bisinuate, the basal margin extending about two-thirds to middle; transverse impressions obsolete; median line fine, abbreviated at each end; basal impressions distinct, the outer fovea shorter than the inner and usually slightly oblique; surface usually sparsely punctate at base; hind angles sharply rectangular, not carinate. Elytra together very slightly wider than the thorax, rather finely striate, not acuminate behind; striæ entire, not deeper behind, at most obsoletely punctate, the scutellar stria terminating at base in an ocellate puncture, the eighth with the row of ocellate punctures rather narrowly interrupted at middle; intervals flat. Body beneath black, impunctate. Legs rufotestaceous, the tarsi slightly darker; apical spur of the anterior tibiæ with the middle lobe acute. Length .22-.32 inch; 5.5-8 mm.

Resembles most closely *A. longula*, from which it is recognizable by the impunctate parapleuræ and sides of metasternum and abdomen, as well as by the proportionally wider prothorax, the apex of which is more distinctly emarginate. From *angustata* it is readily distinguishable by the characters given in the table. From *scitula* it differs by the color of the legs and the slightly different form of thorax, while the color of the antennæ, different form, and acute middle lobe of the trifid spur of the anterior tibiæ separate it from *belfragei*, and the presence of an ocellate puncture at the base of the scutellar stria of the elytra will serve to distinguish it from *afoveolata*.

It occurs in Canada, the Lake Superior region, Mt. Washington and Shelburne, New Hampshire, Cambridge, Massachusetts, New York, New Jersey, Iowa and Wisconsin.

30. **A. longula** Lec.

This species resembles most closely *A. pallipes*. The prothorax, though proportionally longer as compared with its width, is nearly of the same form, being narrowed anteriorly from slightly behind the middle to the apex, with the sides arcuate in front, subparallel behind, and the hind angles sharply rectangular. The apex, however, is only very feebly emarginate. Beneath, the meso- and metasternal episterna, sides of metasternum and of the ventral segments are coarsely, though usually sparsely, punctured, while in *pallipes* the body beneath is impunctate. In length it varies from .27–.34 inch; 6.75–8.5 mm.

From *scitula* it is distinguishable by the color of the legs and slightly different form of the thorax. The punctuation of the under side is much more marked than in the latter species, in many specimens of which it is almost or entirely wanting. From our other species it is recognizable by the characters given in the table.

It occurs along the Pacific Coast from British Columbia to Southern California.

31. **A. scitula** Zimm.

Separable from our other species of the subgenus by the color of the legs, which are entirely or in great part piceous, the tibiæ and tarsi sometimes rufopiceous, while the femora usually have a more or less metallic lustre. The meso- and metasternal episterna are often very sparsely punctured, but this character does not appear to be constant in any degree. The thorax is narrowed anteriorly from

a slight distance in front of the base and the hind angles are subrectangular. Its size is the same as *longula* (.27–.34 inch; 6.75–8–5 mm.).

It occurs along the Pacific Coast from British Columbia to San Diego, California, extending eastward probably nearly to the Rocky Mountains, specimens being known to me from Idaho and Utah.

32. **A. belfragei** Horn.—Oval. Piceous, surface slightly bronzed, shining. Antennæ rufotestaceous. Prothorax half wider than long, impunctate, arcuately narrowed to the front. Elytra finely striate, more deeply at apex; sixth and seventh lateral striæ almost obliterated. Body beneath piceous, smooth, shining, slightly metallic; epipleuræ slightly paler. Legs rufotestaceous. Length .32–.34 inch; 8-8.5 mm.

Separable from the other species of *Triæna* by the characters given in the table.

It occurs at Waco, Texas.

33. **A. afoveolata** n. sp.—Elongate-oval, slightly convex; form nearly as in *longula*. Black, scarcely metallic, shining. Head as wide as the thorax at apex; frontal grooves distinct; antennæ shorter than the head and thorax, piceous, the first three joints and the fourth at base rufotestaceous; palpi piceous. Prothorax scarcely one-half wider than long, impunctate, very feebly emarginate at apex, narrowed from about the middle to apex; sides with the margin narrowly reflexed, arcuate in front, subparallel behind, the posterior setigerous puncture in the hind angle, equidistant from basal and lateral margins; transverse impressions obsolete; median line very fine, abbreviated in front; basal impressions distinct, the inner fovea longer than the outer; base very feebly bisinuate; hind angles rectangular, not carinate. Elytra scarcely wider than the thorax, finely striate; striæ entire, very finely punctulate to behind the middle, the scutellar stria without ocellate puncture at base, the eighth with the row of ocellate punctures interrupted at middle. Body beneath black, slightly æneous, impunctate. Legs piceorufous; apical spur of anterior tibiæ with the inner lobe acute. Length .29–.32 inch; 7.25-3 mm.

Differs from all our other species of *Triæna* by the absence of the ocellate puncture at the base of the scutellar stria of the elytra. From *longula*, which it most nearly resembles in form, it differs also by the impunctate under side of the body, while another character for its separation from *scitula* is afforded by the color of the legs. The thorax is also of slightly different form from that of the last named species.

Described from one male and two females in the LeConte collection. Of these, two are from Vancouver Island and one from California.

Subgenus **AMARA** s. s.

Prothorax not or scarcely perceptibly wider in front of base. Prosternum margined at tip. Apical spur of the anterior tibiæ simple. Middle tibiæ not dentate on the inner side in the males. Hind tibiæ distinctly pubescent on the inner side in the males.

By their form the species of this subgenus bear most resemblance to *Celia*, from which the line of separation is not clearly defined, a few species of the latter having the hind tibiæ very feebly pubescent on the inner side in the males. The density and length of this pubescence varies to some extent among the species of *Amara* s. s., but it is, however, always distinct. From *Tricena*, the only other subgenus, except the present and *Celia*, in which the prothorax is not wider in front of base, it is readily distinguishable by the simple apical spur of the anterior tibiæ. With *Bradytus*, on the other hand, which approaches it most nearly of any of the subgenera with the thorax wider in front of base, it agrees in having the posterior tibiæ pubescent on the inner side in the males, and is separable from it only by the form of the thorax. In a few species, as in *insignis* and *insularis*, in which the hind angles are somewhat rounded, the thorax is very feebly or scarcely perceptibly narrowed at base, but the narrowing is so slight that it cannot be compared with that seen in any of our species of *Bradytus*. The two species last named seem to approach that subgenus more nearly than any others in our fauna, the deep puncture at the middle of the prosternum in the males recalling the punctured fovea occurring in the same situation in that sex in many Bradyti. From the other three subgenera represented in our fauna, *Leiocnemis*, *Leironotus* and *Cyrtonotus*, it is readily recognizable both by the form of the thorax and by the pubescence of the hind tibiæ of the males, while from the two last it differs, in addition to the above characters, by the prosternum margined at tip.

The secondary sexual characters are well marked. In addition to the characters above mentioned and the dilatation of the anterior tarsi in the males, the number of setigerous punctures on each side of the tip of the last ventral segment differs in the two sexes, there being one in the males, two in the females of all our species. In several European species, however, the number of these punctures is the same in both sexes, as for instance *similata*, in which two are present, and *communis*, in which there is but one. The males of at

least two foreign species, *similata* and *ovata*, have the middle tibiæ pubescent on the inner side. I have not detected this character in any of those in our fauna.

It is hoped that the following table will assist in the recognition of our species:

Scutellar stria terminating in an ocellate puncture at base.....2.
Scutellar stria not terminating in an ocellate puncture at base.....3.
2. Antennæ with the third joint not carinate above.
Thorax deeply emarginate at apex, the anterior angles prominent; legs piceous or rufopiceous, tibiæ and tarsi paler. Length .28–.40 inch.
36. **impunctricollis** Say.
Thorax broader, less deeply emarginate at apex; legs darker. Length .29–.33 inch..... 37. **littoralis** Esch.
Antennæ with the third joint carinate above. Length .30–.38 inch.
38. **fallax** Lec.
3. Prosternum of male without deep puncture at middle.....4.
Prosternum of male with a deep puncture at middle; striæ of elytra impunctate; anterior and middle femora with numerous setigerous punctures along the inner margin, the posterior with two; antennæ with joints 2-3 not carinate above.
Base of thorax punctured. Length .35–.50 inch .....34. **insignis** Dej.
Base of thorax not punctured. Length .37–.45 inch..35. **insularis** Horn.
4. Antennæ with joints 2-3 not carinate above.....5.
Antennæ with joints 2-3 carinate above.....8.
5. Base of thorax and elytral striæ impunctate or at most obsoletely punctured; body beneath impunctate.....6.
Base of thorax, elytral striæ, sides of metasternum, metasternal episterna and sides of first three ventral segments punctured; front and hind femora with two, the middle with three setigerous punctures along the inner margin. Length .28–.34 inch.....39. **basillaris** Say.
6. Thorax at least one-half wider than long, emarginate at apex; all the femora with two setigerous punctures along the inner margin .....7.
Thorax but little wider than long, apex very feebly emarginate; hind angles sharply rectangular. Length .32 inch....44. **brunnipes** Motsch.
7. Terminal spur of anterior tibiæ stouter than usual; thorax narrowing from basal angles to apex, rather feebly emarginate at apex; posterior lateral seta distant from side margin; form broad, robust. Length .29–.36 inch.....40. **crassispina** Lec.
Terminal spur of anterior tibiæ normal.
Thorax narrowing from basal angles to apex, nearly twice as wide at base as apex, apex very deeply emarginate, posterior lateral seta distant from side margin, hind angles rectangular; head small; form very convex; legs rufous. Length .32 inch..... .....41. **parviceps** n. sp.
Thorax narrowing from in front of base; head normal.
Hind angles of thorax obtuse, the posterior lateral seta distant from side margin and much nearer the basal; legs piceo-rufous. Length .26–.33 inch..... .....42. **cupreolata** Putz.

Hind angles of thorax rectangular, the posterior lateral seta equidistant from side and basal margins; legs black; form less convex. Length .35-.42 inch .....43. **conflata** Lec.

8. Basal impressions of thorax feeble or nearly obsolete.

Middle femora with four setigerous punctures along the inner margin.

Striæ of elytra impunctate; base of thorax impunctate.

Form oblong-oval; posterior lateral seta of thorax nearer the basal than the side margin; dull black or at most feebly æneous. Length .30-.36 inch.....45. **protensa** Putz.

Form rather broadly oval; posterior lateral seta of thorax equidisant from side and basal margins; shining, usually more or less æneous. Length .32-.35 inch .....46. **confusa** Lec.

Striæ of elytra punctured, sometimes very feebly; base of thorax subpunctate. Length .27-.32 inch .....47. **subpunctata** Lec.

Middle femora with two setigerous punctures along the inner margin, striæ of elytra finely punctulate. Length .29-.31 inch.

48. **cœlebs** n. sp.

Basal impressions of thorax well marked, the outer oblique; middle femora with four setigerous punctures along the inner margin. Length .25-.28 inch.....49. **polita** Lec.

34. **A. insignis** Dej.—Form nearly ovate, convex. Color above nigro-æneous or nigro-cyaneous, shining, the females slightly alutaceous. Head slightly narrower than the thorax at apex; antennæ shorter than the head and thorax, not carinate, rufous; palpi rufous. Prothorax subquadrate, about one-half wider than long, narrower at apex, widest immediately in front of the hind angles; apex feebly emarginate; surface impunctate, except at sides of base, where it is distinctly but not densely punctured; median line distinct, extending between the transverse impressions, which are rather feebly marked; basal impressions shallow, bifoveate; sides rounded in front, nearly parallel behind, the margin slightly wider posteriorly; base truncate; hind angles obtuse, rounded, not carinate. Elytra slightly wider than the thorax, subparallel, moderately deeply striate; striæ impunctate, the scutellar stria without ocellate puncture at base, the eighth with the row of ocellate punctures rather narrowly interrupted at middle; intervals nearly flat. Body beneath piceous, impunctate, the posterior ventral segments slightly paler; prosternum rounded at tip. Legs rufopiceous, the anterior and middle femora with numerous, the posterior with two setigerous punctures along the inner margin; tarsi not grooved. Length .35-.50 inch; 8.75-12.5 mm.

The males have a large, deep puncture at the middle of the prosternum. The posterior tibiæ are densely pubescent on the inner side, and the pubescence in this species and the next is longer than usual.

Distinct from all our other species, except *insularis*, by the peculiar prosternal character of the males. From the latter it is readily recognizable by the characters given in the table.

It occurs in California and Alaska.

35. **A. insularis** Horn.

Very close to the preceding, from which it differs by its slightly more convex and more robust form, and by the absence of punctures at the sides of the base of the thorax. I have never seen any specimens with bluish surface lustre, all having a distinct æneous tinge. The femoral setæ are as in *insignis*, and the males have a large, deep puncture at the middle of the prosternum, as in that species. Its length ranges, in some thirty examples studied, from .37–.45 inch; 9.25–11.25 mm.

It occurs on the islands along the coast of the southern part of California. Most of the specimens seen are from Santa Barbara Island, San Nicolas Island and Santa Rosa Island.

36. **A. impunctipennis** Say.—Form oval, convex. Color æneous or nigro-æneous, often tinged with green, shining, the surface alutaceous in the females. Head slightly narrower than the thorax at apex; antennæ shorter than the head and thorax, not carinate, the three basal joints rufous, the outer ones darker; palpi rufopiceous. Prothorax subquadrate, at base as wide as the elytra, narrowed from slightly behind the middle to apex; surface impunctate; apex deeply emarginate, the anterior angles prominent but rounded; transverse and basal impressions obsolete or nearly so, the latter rarely feebly marked, especially the inner fovea; median line fine, abbreviated before and behind; sides with the margin narrowly reflexed, slightly rounded in front, subparallel behind; base very feebly bisinuous; hind angles rectangular, rounded at tip, not carinate, the posterior lateral setigerous puncture nearer the basal than the side margin. Elytra striate; striæ entire, impunctate, the scutellar striæ terminating in an ocellate puncture, the eighth stria with the row of ocellate punctures narrowly interrupted at middle; intervals flat or nearly so. Body beneath black, impunctate; prosternum rounded at tip. Femora piceous, tibiæ and tarsi rufous or rufopiceous; all the femora with two setigerous punctures along the inner margin; middle and hind tarsi with the basal joint grooved on the outer side. Length .28–.40 inch; 7–10 mm.

A study of a large series of specimens shows a comparatively slight range of variation, this being principally in brilliancy of color, size and in the distinctness of the basal impressions. Usually the latter are obsolete or nearly so, while in a comparatively few the inner fovea, although very shallow, is moderately distinct and linear, the outer, at most, existing as a faint and very poorly defined depression.

It seems to make the nearest approach to the subgenus *Triæna*.

From most of our other species it is at once recognizable by the presence of an ocellate puncture at the base of the scutellar stria, a character occurring in nearly all our species of *Triæna*, but observ-

able elsewhere in the present subgenus only in *fallax* and *littoralis*. From the former it is recognizable by the non-carinate third joint of the antennæ, and the prosternum is more attenuate at tip and less broadly rounded. From the latter it is distinguishable only by the slightly longer thorax, which is more deeply emarginate at apex, and by the somewhat paler legs; all characters of rather doubtful value.

The basal joint of both the middle and posterior tarsi is grooved on the outer side, and a shorter groove is usually also to be seen on the second joint of both pairs.

It is very widely distributed, being known to me from Prince Edward Island, Canada, Michigan and the Lake Superior region, Florida, Louisiana, Wyoming, Colorado and from nearly all the States east of the Rocky Mountains, as well as from Oregon, Washington and British Columbia. Mannerheim records it from Alaska.

37. **A. littoralis** Mann.

Separated from *A. impuncticollis* by slight and probably insufficient characters. In *littoralis* the thorax is somewhat broader and less deeply emarginate at the apex, and the legs are darker than in *impuncticollis*.

In size *A. impuncticollis* ranges from .28–.40 inch; 7–10 mm.; *littoralis* from .29–.33 inch; 7.25–8.25 mm. *Amara impuncticollis*, as noted above, is widely distributed; its occurrence in Alaska, however, needs verification. The type of *littoralis* is from Sitkha and all the specimens known to me are from Alaska.

38. **A. fallax** Lec.—Nearly oval, moderately convex, above æneous or nigro-æneous, surface shining in the males, alutaceous in the females. Head slightly narrower than the thorax at apex; antennæ shorter than the head and thorax, piceous or rufopiceous, the three basal joints rufous, joints 2-3 carinate above; palpi piceous. Prothorax subquadrate, impunctate, more than one-half wider than long, widest at base, narrowed from slightly in front of the base to apex; apex emarginate; sides rounded from slightly in front of base, margin narrowly reflexed, the posterior puncture about equidistant from the lateral and basal margins; base feebly bisinuous; transverse impressions obsolete; median line fine, abbreviated in front; basal impressions feeble; hind angles rectangular, not carinate. Elytra slightly wider than the thorax, striate; striæ entire, impunctate, the scutellar stria terminating in an ocellate puncture at base, the eighth with the row of ocellate punctures rather narrowly interrupted at middle; intervals flat. Body beneath black, impunctate; prosternum broadly rounded at tip. Legs dark piceous or nearly black, the tibiæ and tarsi usually

more or less tinged with rufous; all the femora with two setigerous punctures along the inner margin; basal joint of middle and hind tarsi grooved on the outer side. Length .30–.38 inch; 7.5-9.5 mm.

This species resembles very closely *impuncticollis*. The essential character separating the two consists in the carination of the second and third joints of the antennæ. This character is less developed in this species than in most of the others in which it is observable, and, in fact, in some examples the carina of the second joint is scarcely discernable. The thorax is somewhat less deeply emarginate at apex, and the prosternum is more broadly rounded at tip, while the form is slightly less oval. From all our other species of the subgenus, except *impuncticollis* and *littoralis*. it is readily distinguishable by the presence of an ocellate puncture at the base of the scutellar stria of the elytra.

It is known to me from Massachusetts, New York, New Jersey, Pennsylvania, Maryland, Illinois, Missouri, Nebraska, Colorado, New Mexico, Utah, Idaho, Nevada and along the Pacific Coast from California to British Columbia.

39. **A. basillaris** Say.—Form oblong, convex. Color varying from æneous to nearly black, shining. Head scarcely narrower than the thorax at apex; antennæ shorter than the head and thorax, not carinate, piceous, the three basal joints rufous; palpi piceous. Prothorax subquadrate, nearly twice as wide as long, narrowed from about the middle to apex, sparsely but distinctly punctate each side of base; apex slightly emarginate; sides rounded in front, nearly parallel behind, the margin narrowly reflexed; transverse impressions obsolete or nearly so, the anterior sometimes feebly marked; median line very fine; basal impressions usually distinct, the inner longer than the outer, rarely somewhat poorly defined; base very feebly bisinuous; hind angles rectangular, not carinate. Elytra moderately deeply striate; striæ punctate, entire, the scutellar stria without ocellate puncture at base, the eighth with the row of ocellate punctures narrowly interrupted at middle; intervals nearly flat. Body beneath dark piceous or black; prosternum broadly rounded at tip; sides of metasternum and metasternal episterna sparsely punctured, the sides of the first three ventral segments more densely so. Legs rufous or rufopiceous, the femora often darker; anterior and posterior femora with two, the middle femora with three setigerous punctures along the inner margin; tarsi not grooved. Length .28–.34 inch; 7–8.5 mm.

The pubescence of the posterior tibiæ in the males is somewhat more dense and longer than in most of our species. In the females the surface is scarcely perceptibly alutaceous.

The posterior lateral setigerous puncture of the thorax is much smaller than usual, and is about equidistant from the side and basal margins.

One of our most easily recognizable species, possessing several well-marked characters.

It is known to me from New Hampshire, Massachusetts, Rhode Island, New York, Pennsylvania, Maryland and Virginia.

40. **A. crassispina** Lec.—Broadly oval, moderately convex. Æneous or nigro-æneous, shining; surface finely alutaceous, more strongly in the females. Head slightly narrower than the thorax at apex; antennæ not carinate, shorter than the head and thorax, piceous, the three basal joints rufous; palpi piceous. Prothorax subquadrate, impunctate, more than one-half wider than long, narrowed from base to apex; apex slightly emarginate; sides slightly arcuate, more strongly anteriorly, margin narrowly reflexed, the posterior setigerous puncture large, distant from the side margin; transverse impressions obsolete or nearly so; median line fine, abbreviated at each end; basal impressions nearly obsolete, the inner sometimes feebly distinct; base feebly bisinuous; hind angles not prominent, subrectangular, slightly rounded, not carinate. Elytra slightly wider than the thorax, striate; striæ entire, impunctate, the scutellar stria without ocellate puncture at base, the eighth with the row of ocellate punctures rather broadly interrupted at middle; intervals flat. Body beneath black, impunctate; prosternum broad, truncate at tip. Legs rufopiceous, the femora darker; all the femora with two setigerous punctures along the inner margin; anterior tibiæ with the apical spur stouter than usual; tarsi not grooved on the outer side. Length .29–.36 inch; 7.25-9 mm.

In the males the hind tibiæ, although distinctly pubescent, are somewhat less conspicuously so than is usual in the subgenus.

From allied species it seems distinct by the characters given in the table. The position of the posterior marginal setigerous puncture is nearly as in *cupreolata*, while the tip of the prosternum recalls that of *conflata*.

It occurs from Massachusetts southward to South Carolina and Alabama and westward to Lake Superior, but appears to be local.

41. **A. parviceps** n. sp.—Form nearly oblong, very convex. Color black, shining. Head small, slightly narrower than the thorax at apex, and scarcely one-half as wide as the thorax at base; frontal grooves obsolete; antennæ not carinate, with the three basal joints testaceous, the next four rufopiceous (the others lacking in the type); palpi testaceous. Prothorax very convex, about one-half wider than long, narrowed from base to apex; very strongly narrowed from base to apex, very strongly narrowed in front of middle; apex deeply emarginate, the anterior angles prominent, rounded; transverse and basal impressions obsolete; median line fine, abbreviated in front; sides with the margin narrowly reflexed, arcuate, the posterior lateral setigerous punctures large, distant from the side margin; base nearly truncate; hind angles rectangular, not carinate. Elytra not wider than the thorax, parallel to behind the middle, striate; striæ entire, impunctate, the scutellar stria without ocellate puncture at

base, the eighth with the row of ocellate punctures narrowly interrupted at middle; intervals nearly flat. Body beneath black, impunctate; prosternum rounded at tip. Legs dark rufous; all the femora with two setigerous punctures along the inner margin; tarsi not grooved on the outer side. Length .32 inch; 8 mm.

Approaches most nearly *A. cupreolata*, from which it seems abundantly distinct by the form of the thorax, smaller head and color of the legs. The posterior lateral setigerous puncture of the thorax is even more distant from the side margin than in that species.

Only one specimen, a male, is known to me. It is from Lake Superior, and is in the LeConte collection at Cambridge.

42. **A. cupreolata** Putz.—Oval, convex. Cupreo-æneous or more rarely nigro-æneous, shining, the females very finely alutaceous. Head slightly narrower than the thorax at apex; antennæ shorter than the head and thorax, not carinate, piceous, the three basal joints paler; palpi rufopiceous. Prothorax subquadrate, about one-half wider than long, wider at base than apex, impunctate or rarely obsoletely punctured at base; apex deeply emarginate, the anterior angles rounded but prominent; sides narrowed from about one-third in front of base and rounded to apex, margin narrowly reflexed, the posterior setigerous puncture distant from the side margin and distinctly nearer the basal; transverse impressions obsolete; median line fine, abbreviated in front; basal impressions feeble and poorly defined; base nearly truncate; hind angles obtuse, rounded, not carinate. Elytra not wider than the thorax, subparallel to behind the middle, striate; striæ impunctate or rarely obsoletely punctate, entire, the scutellar stria not terminating in an ocellate puncture at base, the eighth with the row of ocellate punctures rather narrowly interrupted at middle; intervals flat or nearly so. Body beneath black, impunctate; prosternum broadly rounded at tip. Legs piceo-rufous, the femora usually darker; all the femora with two setigerous punctures along the inner margin; basal joints of middle and hind tarsi not grooved. Length .26-.33 inch; 6.5-8.25 mm.

The posterior tibiæ of the males are moderately densely pubescent on the inner side.

Superficially this species resembles most closely *impuncticollis*, but is at once recognizable from it by the absence of the ocellate puncture at the base of the scutellar stria. From *conflata* it is readily distinguishable by the obtuse hind angles of the thorax, the position of the posterior lateral seta, as well as by its less robust form and the color of the legs.

Examples have been seen in which the base of the thorax and elytral striæ are sparsely, obsoletely punctate, but they are connected by intergrades with the typical form.

It is known to me from Canada, New Hampshire, Massachusetts, New York, New Jersey, Pennsylvania, Illinois, Kentucky, Utah, Nebraska, Kansas and Colorado.

43. **A. conflata** Lec.—Form broadly oval, moderately convex. Color black, scarcely æneous, surface finely alutaceous, more coarsely in the females. Head slightly narrower than the thorax at apex; antennæ shorter than the head and thorax, not carinate, piceous, the three basal joints rufous; palpi rufopiceous. Prothorax subquadrate, about one-half wider than long, very distinctly wider at base than apex, impunctured; apex emarginate; sides rounded in front, subparallel behind the middle, the margin narrowly reflexed, the posterior lateral setigerous puncture about equidistant from the side and basal margins; base bisinuous; hind angles rectangular, not carinate. Elytra slightly wider than the thorax, striate; striæ entire, impunctate, the scutellar stria without ocellate puncture at base, the eighth with the row of ocellate punctures rather broadly interrupted at middle; intervals nearly flat. Body beneath black, impunctate; prosternum subtruncate or very broadly rounded at tip. Legs black; all the femora with two setigerous punctures along the inner margin; middle and posterior tarsi with the basal joint at most very feebly grooved on the outer side. Length .35-.42 inch; 8.75-10.5 mm.

Easily known from *A. cupreolata* by its larger size and less convex form, as well as by the position of the posterior puncture of the side margin of the thorax and the color of the legs.

It occurs along the Pacific Coast from California to British Columbia, and I have seen one specimen from Utah.

44. **A. brunnipes** Motsch.—Form elongate, convex. Nigro-æneous, very finely alutaceous. Head scarcely narrower than the thorax at apex; antennæ shorter than the head and thorax, not carinate, piceous, the first three joints paler; palpi dark rufous. Prothorax subquadrate, slightly wider than long, wider at base than apex, impunctate; sides subparallel behind, rounded from about the middle to apex, the margin narrowly reflexed; apex very slightly emarginate; transverse and basal impressions obsolete; median line very fine; base truncate; hind angles rectangular, not carinate, the posterior lateral seta in the hind angle. Elytra very slightly wider than the thorax, striate; striæ impunctate, entire, the scutellar stria without ocellate puncture at base, the eighth with the row of ocellate punctures very broadly interrupted at middle; intervals flat. Body beneath dark piceous, impunctate. Front and middle legs dark rufous (the hind pair wanting in the specimen studied); middle femora with two setigerous punctures along the inner margin; terminal spur of anterior tibiæ somewhat stouter than usual. Length .32 inch; 8 mm.

The above description is from a mutillated female in the LeConte collection. It is from California, and is the only example known to me. The anal segment is bisetose each side.

45. **A. protensa** Putz.—Oblong-oval, moderately convex. Black sometimes tinged with blue or rarely slightly æneous, usually dull, the surface alutaceous, more strongly so in the females, at most feebly shining in the males. Head slightly narrower than the thorax at apex; antennæ shorter than the head and thorax, black, the two basal joints rufous, the second usually somewhat darker, joints 2-3 strongly carinate; palpi black. Prothorax subquadrate, more than

one-half wider than long, very distinctly wider at base than apex, impunctate; apex emarginate, the anterior angles prominent, but rounded; sides with the margin narrowly reflexed, rounded from slightly behind the middle to apex, the posterior setigerous puncture nearer the basal than the lateral margin; transverse impressions obsolete or nearly so; median line fine, abbreviated in front; basal impressions feeble or nearly obsolete; base slightly bisinuous; hind angles subrectangular, slightly rounded at tip, not carinate. Elytra slightly wider than the thorax, finely striate, the sides subparallel to behind the middle; humeri slightly prominent; striæ entire, impunctate, the scutellar stria not terminating in an ocellate puncture at base; the eighth with the row of ocellate punctures narrowly interrupted at middle; intervals flat or nearly so. Body beneath black, impunctate; prosternum rounded at tip. Legs black; anterior and hind femora with two, the middle with four setigerous punctures along the inner margin; middle and hind tarsi with the basal joint not grooved on the outer side. Length .30–.36 inch; 7.5–9 mm.

Very closely allied to *confusa*, from which it is not easily recognizable except by comparison. The form is more oblong and less convex, and the color duller and less æneous. The hind angles of the thorax are slightly rounded at tip, and the humeri of the elytra more prominent. The posterior setigerous puncture at the side of the thorax is nearer the basal than the lateral margin.

It is apparently northern in its distribution. Specimens have been seen from the Hudson Bay region, Alberta, Montana, Wyoming and the mountains of Colorado. It was described by Putzeys from the shores of the Rupert River, Hudson Bay Territory.

46. **A. confusa** Lec.—Characters nearly as in *protensa* Putz. Form less oblong, broadly oval, more convex. Color æneous or nigro-æneous, the surface shining. Prothorax slightly less deeply emarginate at apex; posterior lateral setigerous puncture equidistant from side and basal margins; hind angles rectangular. Elytral humeri somewhat less prominent. Middle and hind tarsi with the basal joint at most finely grooved externally. Length .32–.35 inch; 8–8.75 mm.

As will be seen by the above brief resumé of the points of difference between this and the preceding species, the two are difficult of separation, those most worthy of note being the more oval and more convex form of *confusa*, with its more shining surface, and the different position of the posterior puncture of the side margin of the prothorax. The antennæ are of the same color as in *protensa*, with the second and third joints strongly carinate above. The arrangement and number of the setigerous punctures along the inner margin of the femora is also alike in the two species.

It is abundant in the Rocky Mountains of Colorado, extending northward to Alberta, and from thence westward to Oregon and British Columbia.

47. **A. subpunctata** Lec.—Oval, moderately convex. Nigro-æneous, shining; surface finely alutaceous. Head slightly narrower than the thorax at apex; antennæ shorter than the head and thorax, black, the two basal joints paler, joints 2-3 strongly carinate; palpi piceous. Prothorax nearly twice as wide as long, subquadrate, narrowed from slightly in front of base, usually subpunctate at base; apex emarginate, the anterior angles not prominent; sides rounded, the margin narrowly reflexed, the posterior lateral setigerous puncture about equidistant from basal and lateral margins; transverse impressions obsolete; median line fine, subentire; basal impressions shallow and rather feebly defined, the inner linear, the outer forming a broad depression; base truncate; hind angles rectangular, not carinate. Elytra very slightly wider than the thorax, striate; striæ entire, punctate, sometimes very finely, the scutellar stria without ocellate puncture at base, the eighth with the row of ocellate punctures narrowly interrupted at middle; intervals flat. Body beneath black, impunctate. Legs black; anterior and hind femora with two, the middle with four setigerous punctures along the inner margin; tarsi not grooved on the outer side. Length .27–.32 inch; 6.75–8 mm.

Very closely allied to *confusa*, from which it differs by the better defined basal impressions of the thorax and the punctate elytral striæ. The punctuation of the latter is subject to some variation, being usually fine and not clearly defined, although in one or two examples seen it is very distinct. That of the base of the thorax is very feeble, in some specimens obsolete. The basal impressions of the thorax, although better defined than in *confusa* and *protensa*, are much less distinct than in *polita*.

It occurs in Colorado and New Mexico.

48. **A. cœlebs** n. sp.—Form rather elongate, nearly oval, convex. Color above æneous, shining, the inflexed portion of the elytra more or less tinged with green; surface very finely alutaceous. Head as wide as the thorax at apex; frontal grooves very short, punctiform; antennæ shorter than the head and thorax, black, the two basal joints dark rufous, joints 2-3 distinctly carinate above; palpi black. Prothorax subquadrate, more than one-half wider than long, impunctate, narrowed from slightly in front of base; apex emarginate; sides rounded, the margin narrowly reflexed, the posterior lateral setigerous puncture much nearer the basal than the side margin; base truncate; transverse impressions obsolete; median line very fine, abbreviated in front; basal impressions feeble; hind angles slightly obtuse, slightly rounded at tip, not carinate. Elytra scarcely wider than the thorax, finely striate; striæ entire, finely but distinctly punctulate, sutural stria without ocellate puncture at base, the eighth with the row of ocellate punctures rather broadly interrupted at middle; intervals flat. Body beneath black, slightly æneous, impunctate; prosternum very

broadly rounded at tip. Legs nearly black, with slight æneous lustre; all the femora with two setigerous punctures along the inner margin; basal joint of middle and hind tarsi not grooved on the outer side. Length .29–.31 inch; 7.25–7.75 mm.

With the exception of *fallax*, this is the only species having two setigerous punctures along the inner margin of the middle femora, in which the second and third antennal joints are carinate. From the latter species it is at once recognizable by the absence of an ocellate puncture at the base of scutellar stria, as well as by other characters. The punctured elytral striæ are of rare occurrence in the present subgenus.

Described from five males from Osoyoos, British Columbia. For the example in my cabinet I am indebted to the generosity of Mr. Chas. Liebeck.

49. **A. polita** Lec.—Oval, moderately convex. Æneous or nigro-æneous, sometimes distinctly bluish, shining. Head nearly as wide as the thorax at apex; antennæ shorter than the head and thorax, piceous, the three basal joints paler, joints 2-3 distinctly carinate; palpi piceous. Prothorax subquadrate, more than one-half wider than long, narrowed from about one-third in front of base, impunctate or obsoletely punctured at base; apex emarginate, sides rounded in front, margin narrowly reflexed, the posterior lateral seta in the hind angle; transverse impressions obsolete; median line fine, abbreviated in front; basal impressions distinct, the inner longer than the outer, which is oblique; base truncate; hind angles rectangular, not carinate. Elytra only very slightly wider than the thorax, finely striate; striæ entire, impunctate; scutellar stria without ocellate puncture at base, the eighth with row of ocellate punctures not widely interrupted at middle; intervals flat or nearly so. Body beneath black, impunctate; prosternum rounded at tip. Legs piceous or rufopiceous, the femora darker; front and hind femora with two, the middle with four, setigerous punctures along the inner margin; tarsi not grooved on the outer side. Length .25–.28 inch; 6.25–7 mm.

A well-marked little species, readily distinguishable from the others with the second and third antennal joints carinate by the deeper basal impressions, the outer of which is oblique, as well as by its smaller size.

It occurs throughout the Middle States, being known to me from as far east as Pittsburg, Pa., and extending northward to Lake Superior and westward to Colorado.

Bibliography and Synonomy.

Subgenus **CYRTONOTUS** Steph.

1. *A. pterostichina* n. sp.
2. *A. thoracica* n. sp.
3. *A. blanchardi* n. sp.
4. *A. jacobina* Lec., Proc. Acad. Phil. 1855, vii, p. 346.
5. *A. stupida* Lec., Proc. Acad. Phil. 1855, vii, p. 347.
6. *A. bowditchi* n. sp.
7. *A. adstricta* Putz., Mém. Liége, 1866, Sér. 2, i, p. 238.
8. *A. laticollis* Lec., Ann. Lyc. 1848, iv, p. 368 (*Curtonotus*); Proc. Acad. Phil. 1855, vii, p. 347.
   convexiusculus ‡ Kirby, Faun. Bor. Am. 1837, iv, p. 35.
9. *A. carinata* Lec., Ann. Lyc. 1848, iv, p. 368 (*Curtonotus*).
10. *A. rufimana* Kirby, Faun. Bor. Am. 1837, iv, p. 35 (*Curtonotus*); Lec., Proc. Acad. Phil. 1855, vii, p. 347.
    brevilabris Kirby, loc. cit., p. 35 (*Curtonotus*).
    lacustris Lec., Proc. Acad. Phil. 1855, vii, p. 346.
    reflexus Putz., Mém. Liége, 1866, Sér. 2, i, p. 241.
11. *A. cylindrica* Lec., Bull. U. S. Geol. and Geog. Surv. 1878, iv, p. 450.
12. *A. hudsonica* n. sp.
13. *A. eschscholtzi* Chaud., Bull. Mosc. 1837, No. 7, p. 36 (*Leirus*); Lec., Proc. Acad. Phil. 1855, vii, p. 348; Putz., Mém. Liége, 1866, Sér. 2, i, p. 249.
14. *A. melanogastrica* Dej., Spec. 1828, iii, p. 519; Mann., Bull. Mosc., 1843, xvi, p. 210; Lec., Proc. Acad. Phil. 1855, vii, p. 348.
    melanogaster Sturm., Cat. 1826, p. 91.
15. *A. brunnipennis* Dej., Spec. 1831, v, p. 800; Putz., Mém. Liége, 1866, Sér. 2, i, p. 252.
    borealis Chaud., Bull. Mosc. 1853, xvi, p. 775 (*Leirus*).
    hyperborea Lec. ‡ Proc. Acad. Phil. 1855, vii, p. 256.
    obtusa Lec., Proc. Acad. Phil. 1855, vii, p. 348.
16. *A. infausta* Lec., Proc. Acad. Phil. 1855, vii, p. 347; Putz., Mém. Liége, 1866, Sér. 2, i, p. 250.
    rufimana ‖ Mots., Mem. Acad. St. Petersb. 1842, p. 176.
    carinata ‡ Mann., Bull. Mosc. 1853, xxvi, p. 134 (*Leirus*).
17. *A. elongata* Lec., Agass. L. Sup. 1850, p. 207, pl. 8, fig. 5 (*Curtonotus*); Proc. Acad. Phil. 1855, vii, p. 348.
    ? *hyperborea* Dej., Spec. 1831, v, p. 800.
18. *A. pennsylvanica* Nobis.
    fulvipes ‖ Putz., Mém. Liége, 1866, Sér. 2, i, p. 235.
19. *A. hæmatopa* Dej., Spec. 1828, iii, p. 769 (*Feronia*); Putz., Mém. Liége, 1866, Sér. 2, i, p. 260.
    similis Kirby, Faun. Bor. Am. 1837, iv, p. 34 (*Stereocerus*).

Subgenus **LEIRONOTUS** Ganglb.

20. *A. arenaria* Lec., Ann. Lyc. 1848, iv, p. 403 (*Geobænus*); Proc. Acad. Phil. 1868, p. 382.

Subgenus **LEIOCNEMIS** Zimm.

21. *A. avida* Say, Journ. Acad. Phil. 1823, iii, p. 148 (*Zabrus*); Trans. Am. Phil. Soc. 1834, iv, p. 428 (*Pelor*); Ed., Lec. ii, pp. 95 and 541; Lec., Proc. Acad. Phil. 1855, vii, p. 346; Putz., Mém. Liège, 1866, Sér. 2, i, p. 220.
confinis Dej., Spec. 1828, iii, p. 510.

Subgenus **BRADYTUS** Zimm.

22. *A. exarata* Dej., Spec. 1828, iii, p. 509; Lec., Proc. Acad. Phil. 1855, vii, p. 348; Putz., Mém. Liège, 1866, Sér. 2, i, p. 264.
furtiva Say, Trans. Am. Phil. Soc. 1834, iv, p. 429; Ed., Lec. ii, p. 543; Lec., Proc. Acad. Phil. 1855, vii, p. 349.
brevis Sturm., Cat. 1826, p. 148 (*Harpalus*).
23. *A. glacialis* Mann., Bull. Mosc. 1853, xxvi, p. 135 (*Bradytus*); Putz., Mém. Liège, 1866, Sér. 2, i, p. 233 (*Curtonotus*).
24. *A. putzeysi* Horn, Trans. Am. Ent. Soc. 1875, v, p. 129.
25. *A. apricaria* Payk., Mon. Carab. 1790, p. 125 (*Carabus*); Dej., Spec. 1828, iii, p. 506.
26. *A. schwarzi* Nobis.
septentrionalis || Lec., Ann. Lyc. 1848, iv, p. 358; Proc. Acad. Phil. 1855, vii, p. 349.
27. *A. latior* Kirby, Faun. Bor. Am. 1837, iv, p. 36; Lec., Proc. Acad. Phil. 1855, vii, p. 356.
hyperborea ‡ Lec., Ann. Lyc. 1848, iv, p. 357.
lævistriata Putz., Mém. Liége, 1866, Sér. 2, i, p. 262.
libera Lec., Proc. Acad. Phil. 1855, vii, p. 349.
oregona Lec., Proc. Acad. Phil. 1855, vii, p. 349.

Subgenus **TRIÆNA** Lec.

28. *A. angustata* Say, Trans. Am. Phil. Soc. 1823, ii, p. 36 (*Feronia*); ibid., 1834, iv, p. 428 (*Amara*); Ed. Lec. ii, pp. 463 and 542; Lec., Proc. Acad. Phil. 1855, vii, p. 349; Putz., Mém. Liège, 1866, Sér. 2, i, p. 176; Horn, Trans. Am. Ent. Soc. 1892, xix, p. 18.
indistincta Hald., Proc. Acad. Phil. 1843, i, p. 300; Lec., Ann. Lyc. 1848, iv, p. 365.
29. *A. pallipes* Kirby, Faun. Bor. Am. 1837, iv, p. 39; Lec., Proc. Acad. Phil. 1855, vii, p. 350; Horn, Trans. Am. Ent. Soc. 1892, xix, p. 18.
depressa Lec., Ann. Lyc. 1848, iv, p. 365.
30. *A. longula* Lec., Proc. Acad. Phil. 1855, vii, p. 350; Horn, Trans. Am. Ent. Soc. 1892, xix, p. 19.
31. *A. scitula* Zimm., Giste. Faun. 1832, i, p. 32; Silb. Rev. 1834, ii, p. 223; Lec. Proc. Acad. Phil. 1855, vii, p. 350; Horn, Trans. Am. Ent. Soc. 1892, xix, p. 19.
32. *A. belfragei* Horn, Trans. Am. Ent. Soc. 1892, xix, p. 19.
33. *A. sfoveolata* n. sp.

Subgenus **AMARA** s. s.

34. *A. insignis* Dej., Spec. 1831, v, p. 796; Mann., Bull. Mosc. 1843, xvi, p. 208; Lec., Proc. Acad. Phil. 1855, vii, p. 350.
compacta Mots., Käf. Russ. 1850, p. 59.
cærulea Mots., Bull. Mosc. 1859, xxxii, p. 153.

35. *A. insularis* Horn, Trans. Am. Ent. Soc. 1875, v, p. 128.
36. *A. impunctícollis* Say, Trans. Am. Phil. Soc. 1823, ii, p. 36 (*Feronia*); ibid., 1834, iv, p. 428 (*Amara*); Ed. Lec. ii, pp. 463 and 542; Kirby, Faun. Bor. Am. 1837, iv, p. 39; Mann., Bull. Mosc. 1853, xxvi, p. 135; Lec., Proc. Acad. Phil. 1855, vii, p. 351; Putz., Mém. Liège, 1866, Sér., 2, i, p. 179.
    trivialis ‡ Dej., Spec. 1827, iii, p. 464.
    anthracina Hald., Proc. Acad. Phil. 1843, i, p. 300.
    difficilis Lec., Ann. Lyc. 1848, iv, p. 362.
37. *A. littoralis* Mann., Bull. Mosc. 1843, xvi, p. 207; ibid., 1853, xxvi, p. 137, note; Lec., Proc. Acad. Phil. 1855, vii, p. 351; Putz., Mém. Liége, 1866, Sér. 2, i, p. 180.
    plebeja var. Dej., Spec. 1827, iii, p. 467.
38. *A. fallax* Lec., Ann. Lyc., 1848, iv, p. 362; Proc. Acad. Phil. 1855, vii, p. 352; Putz., Mém. Liége, 1866, Sér. 2, i, p. 179.
    ovalis Sturm., Cat. 1843, p. 28.
39. *A. basillaris* Say, Trans. Am. Phil. Soc. 1823, ii, p. 35 (*Feronia*); ibid., 1834, iv, p. 428 (*Amara*); Ed. Lec. ii, pp. 462 and 542; Lec., Proc. Acad. Phil. 1855, vii, p. 351; Putz., Mém. Liége, 1866, Sér. 2, i, p. 185.
    lucidula Dej., Spec. 1828, iii, p. 477.
    marylandica Casey, Cont. Coleopt. 1884, pt. 1, p. 4.
40. *A. crassispina* Lec., Proc. Acad. Phil. 1855, vii, p. 352.
41. *A. parviceps* n. sp.
42. *A. cupreolata* Putz., Mém. Liége, 1866, Sér. 2, i, p. 180.
43. *A. conflata* Lec., Proc. Acad. Phil. 1855, vii, p. 352.
44. *A. brunnipes* Mots., Bull. Mosc. 1859, xxxii, p. 154.
45. *A. protensa* Putz., Mém. Liége, 1866, Sér. 2, i, p. 183.
46. *A. confusa* Lec., Ann. Lyc. 1843, iv, p. 361; Proc. Acad. Phil. 1855; vii, p. 352; Putz., Mém. Liége, 1866, Sér. 2, i, p. 181.
47. *A. subpunctata* Lec., Proc. Acad. Phil. 1855, vii, p. 352.
48. *A. cœlebs* n. sp.
49. *A. polita* Lec., Ann. Lyc. 1848, iv, p. 364; Proc. Acad. Phil. 1855, viii, p. 352; Putz., Mém. Liége, 1866, Sér. 2, i, p. 181.
    convexa Lec., Ann. Lyc. 1848, iv, p. 363; Proc. Acad. Phil. 1855, vii, p. 352; Putz., Mém. Liége, 1866, Sér. 2, i, p. 181.

APPENDIX.

I have thought best to reprint here the original descriptions of those species which remain as yet unrecognized in this country, as the works in which they were published are inaccessible to a majority of the students of our fauna. All these species were referred to the subgenus *Cyrtonotus*.

A. canadensis Putz., Mém. Liége, 1866, Sér. 2, i, p. 256.

"Long. 11.—Lat. 4½ mill."

"Piceus, elytris submetallicis: palpis testaceis, antennis pedibusque brunneis; oculi prominuli. Prothorax transversus, utrinque angustatus lateribus leviter rotundatis, angulis posticis rectis; margine basali bisinuato, basi ipsa punctulata, foveolisqueduabus oblongis punctatis impressa. Elytra convexa, oblongo-ovata, humeris subrotundatis, striato-punctata; episternis abdomeinisque lateribus punctatis."

"Par son corselet rétréci en avant, cette espèce se rapproche du *C. Conoideus*; elle est beaucoup plus petite, plus brillante, avec un reflet verdâtre sur les élytres. Les yeux sont beaucoup plus saillants moins enchâssés en arrière; le corselet est plus court, moins étroit en avant; ses angles antérieurs sont moins déprimés, les côtés un peu plus rétrécis avant les angles postérieurs qui sont droits: le bord marginal est simplement bisinué et nullement réfléchi; la base est ponctuée de même, mais l'impression interne est plus oblique et la carène près de l'impression externe est plus élevée; l'impression transversale antérieure est également parsemée de très-petits points; le rebord marginal est encore moins relevé et plus étroit: les élytres sont plus convexes, plus courtes, plus arrondies antérieurement et non dilatées postérieurement; les épaules sont presqu' arrondies; les stries sont aussi profondes que dans le *C. Fodinæ*, mais les points sont plus gros et les intervalles plus convexes. Tout le dessous du corps est parsemé de gros poins entremêlés d'autres points plus petits."

"Canada boréal."

"La collection de M. de Chaudoir nerenferme qu' une ♀."

A. holmbergi Putz., ibid., p. 250.

"Long. 11½.—Lat. 4⅜ m." [4⅜ is the way printed.]

"Très-voisin du *C. Eschscholtzii;* un peu plus grand, plus large, avec le corselet plus élargi et plus arrondi en avant, plus rétréci vers la base, les angles postérieurs un peu plus saillants. La dent supérieure des tibias intermédiaires est très-forte; l'inférieure est peu marquée."

"Amérique Russe. Un ♂. coll. de Chaudoir."

A. somnolentus Putz., ibid., p. 243.

"Long. 12.—Lat. 5 m."

"Niger, elytris œnescentibus; palpis, antennis pedibusque fuscis. Prothorax subcordatus, angulis posticis acutis subreflexis, margine laterali anguste marginato, foveolis posticis profundioribus. Elytra subcylindrica humeris rotundatis."

"Extrêmement voisin du *C. Convexiusculus* dont il ne diffère que par des points

suivants: le corselet est plus convexe, plus régulièrement arrondi sur les côtés qui ne se redressent qu' aux angles postérieurs lesquels sont moins grands; la plus grande largeur du corselet est au milieu; les angles antérieurs sont plus déprimés, plus arrondis; la base est plus échancrée au milieu; les points qui la couvrent sont plus gros et remontent plus haut; les deux fossettes sont plus profondes, plus séparées l'une de l'antre; la fossette interne est plus longue. Les élytres sont un peu plus larges, les épaules plus arrondies. Les épisternes metathoraciques sont plus fortement ponctués. La dent supérieure des tibias intermédiaires est très-forte; l'inférieure est à peine marquée."

"Un ♂, venant d'Ounalaschka, dans la collection de Mr. de Chaudoir. J'en possède une ♀ provenant de la même localité."

A. transversicollis Putz., ibid., p. 236.

"Long. 12.13.—Lat. 5¼.6 m."

"Niger, palpis, antennis pedibusque testaceis, tibiis obscurioribus. Prothorax transversus, ad angulos anticos rotundatos subangustatus, postice sinuatus, angulis anticis prominulis, medio excepto punctulatus, ad margines explanatus. Elytra pronoto latiora, oblongo-ovata, humeris rotundatis."

"Noir ou noir brunâtre, légèrement verdâtre sur les élytres; des palpes, les antennes, les pattes et les bords du corselet sontl'un testacé rougeâtre; les tibias sont d'une teinte un peu plus foncée."

"Les yeux ne sont nullement enchâssés en arrière; la tête est parsemée de points et de rides très-apparents, mais pen profunds. Le corselet, en carré transversal, également rétréci en avant et en arrière; le bord antérieur est coupé droit; les angles sont arrondis; les côtés sont régulièrement arqués jusqu' au de la milieu; un peu avant les angles postérieurs, ils se rétrécissent légèrement et tombent droit sur la base; les angles postérieurs sont cependant un peu aigus; le bord postérieur est tronqué, mais abaissé au point o[u] aboutissant les deux fossettes, ce que le fait paraître bi-sinué. Les côtés sont déprimés; le rebord est assez élevé. Le bord antérieur, les côtés et la base du corselet sont couverts de points assez serrés qui sont plus gros dans les deux fossettes de la base; l'inteovalle entre la carène externe et le bord marginal est même ponctué; la fossette interne est peu distincte."

"Les élytres sont de moitié plus larges que le corselet, en ovale allongé, peu convexes; le rebord basal remonte depuis l'écusson jusqu' à l'angle huméral qui est arrondi; le bord marginal est assez large. Les stries sont profondes et ponctuées; les intervalles sont assez plans; les 3[e] et 5[e] sont un peu moins larges que les autres. Les épisternes métathoraciques, sillonées de chaque côté, portent des points épars. Les premiers segments abdominaux et les côtés des autres sont couverts de points serrés."

"Les deux dents en dessous des tibias intermédiaires sont à peine marquées; l'échancoure qui les sépare est large et peu profonde."

"Amér. Russe. (Akina) 2 ex. dans la coll. de Chaudoir."

A. tristis Putz., ibid., p. 255.

"Long. 9.—Lat. 4 mill."

Brunneo-piceus, palpis testaceis; antennis pedibusque rufis. Oculi prominuli. Prothorax transversus, lateribus rotundatis, basi angustata, angulis posticis rectis, margine basali subsinuato, basi ipsa punctulata, foveolis 2 profundis notata,

carinaque acuta ad angulos posticos. Elytra oblongo-ovata, subparallela, humeris obtusis, profunde punctato-striato. Corpus subtus punctulatum. Tibiæ intermediæ subtus obtuse bidentatæ."

"Les yeux sont aussi saillants que dans le *C. Canadensis*, mais la carène interne est moins élevée; le corselet est un peu plus court, beaucoup plus régulièrement arrondi sur les côtés dont le rebord est plus large et qui se rétrécissent plus fortement avant les angles postérieurs: ceux-ci sont plus saillants; le bord basal est un peu échancré dans le milieu; la base est plus déprimée de chaque côté, un peu moins ponctuée, les deux impressions sont moins distinctement linéaires et la carène externe est beaucoup plus tranchante. Le sillon longitudinal est plus profond, surtout au milieu. Les élytres sont plus étroites, plus parallèles, surtout en-dessous des épaules, celles-ci dépassent notablement les angles postérieurs du corselet. Les stries, leur ponctuation et le dessous du corps sont comme dans le *C. Canadensis*. Le prosternum porte au milieu un enfoncement triangulaire qui se prolonge en forme de sillon vers la pointe. Les tibias intermédiaires ont en dessous deux dents peu proéminentes et assez obtuses,"

"Canada boréal (Owho-Bay.)"

A. angustata Sahlb., Vega Exped. à Berings Sunds Amer. Kust * * * Stockholm, 1885.

"Elongata, angustior, nigro-picea, nitida, antennis pedibusque rufo-testaceis, illis extrorsum tarsisque piceis; prothorace antice coleopterorum latitudine, basi paullo angustiore, lateribus rotundatis, angulis basalibus obtusiusculis, haud prominentibus, ante basin transversim depresso, utrinque biimpresso et parce punctulato, pectore parce obsoleteque punctato; elytris mediocriter punctato-striatis, interstitiis planis. Long 4 lin."

"Mas ignotus."

"*A. (C.) caligatæ* Putz. affinis, sed angustior, magis linearis, prothoracis angulis posticis magis obtusis, antennisque pallidioribus distinguenda. Ab *A. (C.) Eschscholtzii* Chaud., cui forma prothoracis et colore antennarum affinis videtur, differt statura angustiore.—Caput omino ut in *A. caligata*. Palpi nigri, basi apiceque picei. Anteunæ tenuiores, rufo-testaceæ, pubescentes, articulis infuscatis. Prothorax capite fere duplo et longitudine sua dimidio latior, angulis anticis deflexis, rotundatis, lateribus satis fortiter rotundatis, basi paullo angustatis, angulis posticis obtusiusculis, ne minime quidem prominentibus: supra modice, convexus, ante basin satis fortiter transversim depressus, utrinque biimpressus, circa impressiones punctis nonnullis parvis sparsis impressis, medio lævis, canali media ut in congeneribus. Elytra prothorace vix latiora, humeris late rotundatis, sublinearia, leviter convexa, piceo-nigra, satis fortiter ut in *A. caligata* punctato-striata; interstitiis planis. Corpus subtus piceo-nigrum, nitidulum, propleuris lævibus, mesopleuris parce et metapleuris parcissime et obsolete punctatis; episternis metathoracis postice subcoarctatis, margine laterali basali circiter ⅓ longiore. Pedes rufo-testacei, tarsis piceis."

"Ett enda honexemplar hemfördes."

[The name *angustata* is preoccupied (Say, Trans. Am. Phil. Soc., 1823, ii, p. 35). R. H.]

THE DIPTEROUS FAMILY HELOMYZIDÆ.

BY J. M. ALDRICH AND P. S. DARLINGTON.

(Plates III-IV.)

[NOTE.—This family of flies was taken up for study and revision by Mr. Darlington while a senior student in the University of Idaho. At the time of his graduation in June, 1907, he had nearly finished most of the genera, including the drawing up of descriptions of the species, new and old. At this time his appointment as horticultural inspector in an important field at Wenatchee, Wash., necessitated his immediate departure. As we had assumed obligations on all sides by borrowing material, there was no course open to me but to complete the work, which after some delay I have done. My part, aside from a general review, has been to work up the genera *Leria* and *Siligo*, and to prepare the illustrations. The new genus *Siligo* and its two species, and the new species of of *Leria* (*glauca*), should be credited to me; the other new genus, *Porsenus*, and the remaining new species, six in number, should be credited to Mr. Darlington, whose industry and keen discrimination left little for me to do as far as his time permitted him to go.—J. M. ALDRICH.]

This small family of Acalyptrate Muscidæ is readily distinguished by the following characters: wings with auxiliary vein and second basal cell distinct, and a row of spines along the costa; vibrissæ present; fronto-orbital bristles only one or two; all the tibiæ with preapical bristles.

Czerny, from a slightly different view point, defines the same group as follows: "The Helomyzidæ belong to that series of groups of Acalyptratæ which possess convergent or crossed (also called decussate) postvertical bristles. They are distinguished from all the other groups of this series by the simultaneous occurrence of vibrissæ and an entirely separate auxiliary vein." The postvertical bristles are located on the back of the head, somewhat behind the ocelli, and are easily seen.

For practical purposes the costal spines are almost sufficient to distinguish the family, but these do occur in a few species outside the family, especially in *Cyrtonotum*, *Cœnia* and *Fucellia*, of our fauna. *Cyrtonotum* (Pl. IV, figs. 8, 9) has a short first longitudinal vein, united towards the tip with the auxiliary; *Cœnia* has the typical Ephydrid face, and the second basal cell united with the discal; while *Fucellia* has a row of fronto-orbital bristles extending to the base of the antennæ, some six in number.

The costal spines in *Heteromyza* are said to be very small, but there seems to be no good reason for regarding this as a North American genus, and we have not taken it into account.

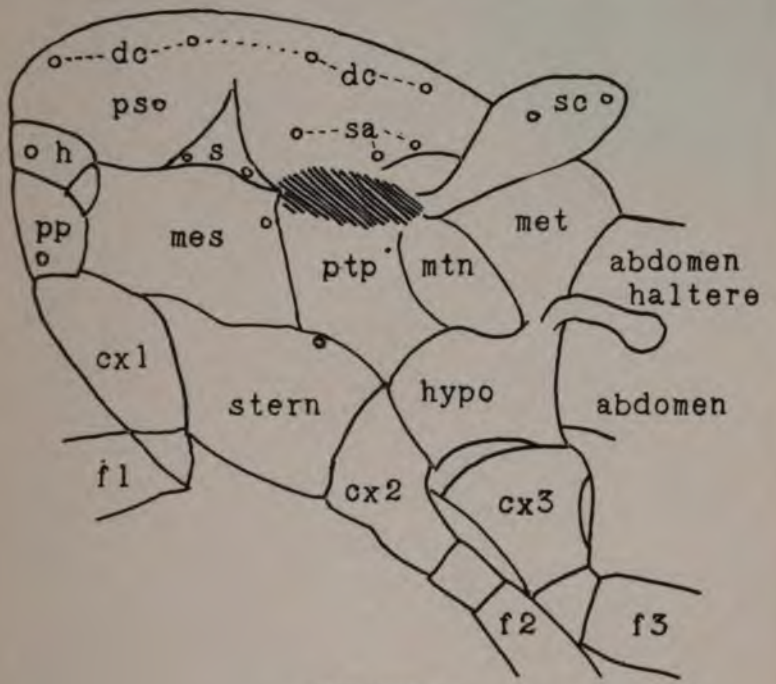
The larval habits are known in only a few cases in our fauna. Some of the species are found in caverns, where the larvæ are said to breed in the excrement of bats. The adults of others are found about the mouths of holes occupied by rodents; other species are adapted to life on sand dunes. The known habits are mentioned under the separate species.

The classic paper on the family is Loew's "Ueber die europäischen Helomyzidæ und die in Schlesien vorkommenden Arten derselben," published in the Zeitschrift für Entomologie, xiii, 1–80. The work bears the date 1859, but as determined by Osten Sacken and Czerny it must have been published in 1862 or early in 1863. There appear to be no names of about that period conflicting with Loew's, hence the exact date is not of great importance. Schiner's treatment of the family in Fauna Austriaca, Diptera, ii, 20–35, 1864, really antedates in its preparation the paper by Loew; hence it is practically superseded by the latter, especially in the matter of genera. The only other general work on the family is a recent one by Czerny, "Revision der Helomyziden," in Wiener Entomologische Zeitung, xxiii, 199–244 and 263–286, published in 1904. This includes the Helomyzinæ (only the genera *Helomyza* and *Allophyla*), being Part I of a work as yet unfinished. The descriptions of the American species are quoted; one useful feature of the work is a set of notes on Walker's types of Helomyzidæ, showing that none of the species belong to the family at all, unless it may be among the small number of which the types are now missing. Nearly all are Sapromyzas.

Loew based his classification mainly on characters derived from the bristles; hence this was the first family in which chætotaxy was used, and that long before the introduction of the term.

The bristles which by their variability afford generic characters are first of all the dorso-centrals, which occur in all the numbers from one to five; the humeral and propleural (either one each or absent) are also useful. The figure on Plate III shows the position of the various parts and bristles of the thorax.

Important specific characters are found in the number of sternopleural bristles, the presence or absence of hair or bristles on the



EXPLANATION.

dc, dorsocentral bristles, four in a row.
h, humerus, with one bristle.
s, the widened lateral end of the transverse suture, which is obsolete in the middle of the dorsum; the two notopleural bristles are located so that the s is between them.
ps, the presutural bristles.
sa, the three supra-alar bristles.
sc, the scutellum with the two scutellar bristles, apical and lateral.
mes, mesoternum, with one mesosternal bristle at the posterior edge.
stern, sternopleura, with one bristle at the upper edge.
pp, propleura, with one bristle on the lower part.
ptp, pteropleura.
mtn, metasternum.
hypo, hyposternum.
met, metanotum.
cx1, cx2, cx3, coxæ.
f1, f2, f3, femora.
The shaded area is the insertion of the wing.

mesopleura, the size of the second fronto-orbital, the pubescence of the scutellum, etc. The constancy of some of the most minute of these characters is interesting.

Our work is based primarily on the collections of the senior author, in which the types, unless otherwise mentioned, will be retained. Important additional material was received from Prof. A. L. Melander, Pullman, Wash.; C. T. Brues, Milwaukee, Wis.; C. W. Johnson, Boston, Mass.; Erich Daecke, Philadelphia, Pa.; and the United States National Museum. A few specimens came from Prof. R. A. Cooley, Bozeman, Montana; E. S. Tucker, Lawrence, Kansas; and C. F. Baker, now of Para, Brazil, but in California at the time of making these collections.

We have cited literature only when the same is not found in the 1905 Catalogue, except when changes of synonymy, etc., are involved. The rest may be found in the Catalogue.

A side view of the thorax of *Anorostoma maculata*, somewhat diagrammatic, to show the sclerites and bristles, the origin of the latter represented by small circles, is given on Plate III.

TABLE OF GENERA.

1. Thorax with long pile, dorsocentrals but little differentiated. **Leria helvola** male.
   Thorax with shorter pile, dorsocentrals well developed ..... 2.
2. One dorsocentral ..... **Porsenus** new gen.
   Two dorsocentrals ..... **Achætomus** Coq.
   Three dorsocentrals ..... **Tephrochlamys** Loew.
   Four dorsocentrals ..... 3.
   Five dorsocentrals ..... 4.
3. Middle tibiæ with spines on the outer side near the middle. **Œcothea** Haliday.
   Eyes very small, with vertical diameter less than the cheeks (Pl. IV, fig. 3). **Eccoptomera** Loew.
   Face very receding, convex in profile, without distinct oral margin (Pl. IV, fig. 4) ..... **Anorostoma** Loew.
   Without the above characters ..... **Leria** Loew.
4. Humeral bristle absent ..... **Helomyza** Fall.
   Humeral bristle present ..... 5.
5. No bristle on mesopleura ..... **Allophyla** Loew.
   A bristle on posterior part of mesopleura ..... **Siligo** new gen.

PORSENUS Darlington, n. gen.

Humeral and propleural bristles absent; only one dorsocentral (the hindmost); only one supra-alar (the foremost); presutural 1; notopleural 2; scutellar a very large apical pair and a small lateral

pair; prescutellar a small pair; fronto-orbital only one, very small; no sternopleural; one pteropleural.

Third joint of the antenna rounded, rather large, with long, bare arista; face receding, oral margin but little prominent, about as in *Anorostoma*.

Wing of ordinary Helomyzid form, costal spines distinct.

The name is from Porsena, one of the invaders of Rome; we change the ending to avoid the confusion of a masculine noun with a feminine ending. Accent on the first syllable.

The singular chætotaxy renders the species and genus easily recognizable, as there are half a dozen good generic characters. The head of the single type was accidentally destroyed after it had been drawn and some notes made, but a further examination in regard to the fronto-orbital bristles and the form of the oral margin would have given us a little greater certainty on these points.

Porsenus johnsoni Darlington, n. sp. (Pl. IV, fig. 2).

Length, 4.7 mm.; of wing, 5.7 mm.

General color ashy gray, with yellow legs.

Occiput gray; front brown; eyes rather large, round; orbits silvery; cheeks about three-fourths the width of the eyes, somewhat cream colored; first two joints of the antenna reddish, third cinereous, round, arista rather long, only microscopically pubescent; one rather long vibrissa on each side.

Dorsum of thorax gray, the lateral edges a little yellowish, median part with coarse and rather dense hairs; mesopleura bare, except for two or three coarse hairs on the front edge, just below the spiracle; sternopleura densely pubescent all over, with no bristle; pteropleura with one good-sized bristle and several coarse hairs.

Abdomen gray, the posterior margin of each segment somewhat reddish.

Wings with a faint brownish tinge, hind cross-vein slightly infuscated. The submarginal cell is rather noticeably widened in front of the anterior cross-vein.

Legs yellowish, with few bristles; femora indistinctly darker; tarsi moderately infuscated.

One female. Johnson: Boston, Mass., October 19th.

ACHÆTOMUS.

Coquillett, Canad. Ent., xxxix, 75, March, 1907.

"Near *Helomyza*, as restricted by Loew, but with only two pairs of dorsocentral bristles, propleural present, two pairs of fronto-orbitals, etc. Eyes circular, cheeks nearly as wide as the eye-height, third joint of antennæ broader than long, arista dorsal, bare. Femora without bristles, tibiæ with apical and preapical bristles only. Venation as in *Helomyza*, spines of costa well-developed. Type, the following species:

"**Achaetomus pilosus** new species.—Reddish brown, the scutellum and legs yellow, bases of abdominal segments three to five dark brown, hairs and bristles black. Hairs of cheeks covering their lower half, no bristles near vibrissæ. Pleura almost wholly covered with hairs except the portion posterior to the sternopleura, one sternopleural bristle, no other pleural bristles present; scutellum without hairs, four scutellar bristles. Wings hyaline, unmarked except the extreme base and the stigma, which are yellowish. Length 8 mm.

"North Saugus, Mass. A male specimen collected by Mr. H. M. Russell. Type No. 10157, U. S. N. M." (Original description entire.)

Not represented in our material.

TEPHROCHLAMYS Loew.

Dorsocentral bristles 3, all behind the suture; humeral 1; propleural 1; notopleural 2; supra-alar 3; scutellar 2 pairs; prescutellar 1 pair, moderately large; presutural 1; fronto-orbital 2. Third antennal joint a very little elongated, arista bare. Face moderately receding. Cheeks about half the width of the eye, with one or two bristles in the middle, at the end of the row of hairs descending behind the eye. Wings rather elongate and narrow, with small spines.

In Becker's part of the Katalog der Paläarktischen Dipteren, iv, 51, the name is spelled Tephrochlamis; there appears to be no etymological reason why the original spelling with a y should not be retained.

TABLE OF SPECIES.

Scutellum wholly yellow ..... **flavitarsis** n. sp.
Scutellum mostly or wholly black in ground color..... **rufiventris** Meigen.

Tephrochlamys flavitarsis Darlington, n. sp.

Length 6 mm.; of wing 5.6 mm.

Cheeks yellow; legs entirely yellow; wings brownish; scutellum entirely yellow.

Head brownish-yellow, occiput brown; front yellowish-brown; antennæ reddish-brown, third joint large, round; arista brown, bare; vibrissæ one on each side, of medium length; also one bristle on the middle of each cheek.

Dorsum of the thorax gray on the middle part, somewhat reddish-gray on the lateral edges; two brown stripes run lengthwise between the dorso-central bristles; dorsum densely pubescent, except the lateral edges; scutellum entirely lemon-yellow, bare except the ordinary four bristles. Propleura and mesopleura brownish, bare except the one propleural bristle; sternopleura reddish-gray, with one strong bristle and a row of smaller hair on the upper edge.

Abdomen yellow, first segment gray.

Wings with a brownish tinge; spines of the costa very short.

Legs entirely yellow.

One female specimen, U. S. N. M., labelled "White Mts., Morrison."

Tephrochlamys rufiventris Meigen.

Length 5.5 mm.; of wing 6.2 mm.

Gray; abdomen reddish-yellow; cheeks whitish.

Occiput ash-gray, front saffron-yellow to brownish, pubescent; orbits of the eyes somewhat silvery-gray; antennæ reddish-brown, the third joint nearly black, arista of medium length, bare; eyes rather large, round; cheeks about three-fourths the width of the eye, somewhat cream color; vibrissæ rather delicate, one on each side; at the middle of the hind edge of the bare part of the cheek is a smallish bristle.

Thorax entirely ash-gray; dorsum pubescent, except the lateral edges; the small hairs arise from small black dots, while the three pairs of dorso-central bristles arise from large black spots; scutellum gray, yellowish at the apex, bare except the ordinary four bristles.

Propleura bare, except the one strong bristle above the fore coxa; mesopleura bare, except one small hair on the lower anterior corner; on the upper edge of the sternopleura is one strong bristle and a row of smaller hairs.

Abdomen reddish-yellow; the hypopygium of the male small; terminal segments in the female tapering, slender.

Wings hyaline except the stigma, which is brownish-yellow; veins dark brown, spines of the costa rather short.

Legs yellow, all the tarsi somewhat blackish, the outer side of the front femur somewhat infuscated; middle femur slender; hind femur rather stout; pulvilli inconspicuous.

Six males and thirty-two females. Johnson, St. John's County, Quebec, June 5th; Boston, Mass., July 7th. U. S. N. M., Franconia, N. H. Daecke, Orange Mountains, N. J., July. Melander, Berkeley, Cal., March 26th; St. Johns, Quebec, September 23rd; Pullman, Wash., March 9th. Aldrich, Friday Harbor, Wash., May 28th; Moscow, Idaho, all seasons.

This species is very common at Moscow, Idaho, and can be found on windows at almost any time during the year.

Becker, Katalog, iv, 51, adopts Meigen's name *canescens*, published in his Systematische Beschreibung, vi, 57, in preference to this, which was published on the following page. As there is no question that the two names refer to the same species, the only point at issue between the two is whether the strict observance of page precedence justifies the changing of a name that is in general use. In this case we are in entire accord with the rules of the International Congress in deciding against change.

ŒCOTHEA Haliday.

Dorsocentral bristles 4 (3 behind the suture); humeral 1; notopleural 2; presutural 1; propleural 1; supra-alar 3; scutellar 2 pairs, the apical divergent; prescutellar 0 or minute; fronto-orbital 1; on the middle tibia near the middle one on the hind side and several on the front. Head rather flattened in front, short in fore and aft measurement; eyes smallish, round; cheeks about half or three-fifths as wide as the eye. Front very wide. Antennæ rather large, third joint not quite round, with long, thin, bare arista. Oral margin prominent. No bristle on cheek. Scutellum elongate. Wings of the usual form, costal spines strong, the hind apical angle of the discal cell generally acute.

The spines on the middle part of the middle tibia are the chief mark of generic distinction; they occur in no other genus of Helomyzidæ.

We have but one species.

Œcothea fenestralis Fallen.

Blepharoptera specus Aldrich, 21st Rept. Geol. Ind., 1896, 189.

Length 4.5 mm.; of wing, the same.

General color brown, legs and feet yellow.

Front brown above, yellowish toward the antennæ, with rather coarse black hairs all over; face light yellow, the distinct antennal grooves darker, a single strong vibrissa on each side; palpi yellow; antennæ dark brown.

Thorax brown on the dorsum, the humeri, entire scutellum, and edges of notum yellow; scutellum with coarse hairs on its dorsal surface; pleuræ largely yellow, the mesopleura and sternopleura darker; mesopleura bare, sternopleura with one bristle and scattered hairs; pteropleura bare; halteres yellow.

Abdomen darker brown, narrowly whitish on the hind edges of the segments, sixth segment and beyond yellow.

Legs wholly yellow, including coxæ and tips of tarsi.

Wings yellowish, veins yellow, cross-veins darker but not distinctly bordered.

The specimen described is perhaps a little lighter in color than the average; there is considerable variation in the intensity and extent of the brown. The tarsi are sometimes infuscated toward the apex, and the scutellum is not always yellow at the base, etc.

Twelve specimens, both sexes. Aldrich: Brookings, S. Dakota; Porter and Wyandotte Caves, Indiana. Johnson: Brookline, Mass. U. S. N. M.: Algonquin, Ill.

The Indiana cave specimens are cotypes of *Blepharoptera specus* Aldrich. Blatchley adds a note to the original description as follows: "The species of Blepharopteræ were the largest and most

common Diptera noted in the caves. They were found in the damper portions of nearly every cave visited, on the walls and roof. They were never noted on the wing, except when disturbed, when they would fly but a short distance before alighting." This refers to *defessa*, *pubescens* and *latens*, as well as the above species.

ECCOPTOMERA Loew.

This genus, not hitherto reported from North America, but represented in Europe by some nine species, is separated from *Leria* primarily by the smallness of the eyes; the figure of our new species illustrates this character.

Chætotaxy: one humeral, one propleural, one fronto-orbital, four dorsocentral, no prescutellar, four scutellar, one presutural, two notopleural, three supra-alar. The middle femur has an irregular row of rather striking bristles on the front side (in our species). Arista always very long and thin. Antennæ small, far apart, with small grooves below them, which are widely separated on the face. Posterior cross vein forming an acute angle with the fifth vein behind, but standing about at a right angle with the longitudinal axis of the wing.

Eccoptomera americana Darlington, n. sp. (Pl. IV, fig. 3).

Length 6.7 mm.; of wing 6.7 mm.

Yellow, including all the tarsal and antennal joints; abdomen more or less blackish.

Head yellow, two dark brown stripes running from the base of the occiput to the vertex; a tuft of small hairs parted in the middle at the base of the occiput; front somewhat saffron yellow, very slightly pubescent; antennæ saffron yellow, the distal end of the second joint bordered with brown; third joint scarcely equaling in length the two preceding taken together, not infuscated; arista long and slender, not pubescent; cheeks straw color, about one and one-fourth times the width of the eye; one strong vibrissa on each side, rather far apart.

Thorax yellow; dorsum with very short and inconspicuous pubescence; dorsocentral bristles large and prominent; scutellum yellow, with sparse pubescence besides the usual four bristles; mesopleura bare except three or four very small hairs on the lower anterior corner; sternopleura with one strong bristle and one smaller hair on the upper edge, sparsely pubescent below.

Abdomen varying from yellow to blackish-yellow; the second, third and fourth segments usually with a blackish posterior border; hypopygium yellow, of medium size.

Legs entirely yellow; pubescence very short and inconspicuous; the front femora armed with two rows of strong bristles, one on the upper edge and one on the lower; hind femora armed with some irregularly placed bristles.

Three males, Moscow and Craig's Mt., Idaho (Aldrich).

ANOROSTOMA Loew.

A humeral and a propleural bristle; three supra-alar; one presutural; two notopleural; one large and one small mesopleural bristle; four dorsocentral bristles; two fronto-orbital bristles. Eyes transversely ovate; cheeks broad; face receding, the front edge of the mouth entirely obliterated (*i. e.* the lower part of the face is not set off from the oral cavity by a sharp margin). The sixth longitudinal vein extends to the margin of the wing. The distinct mesopleural bristle seems to be a valuable generic character.

TABLE OF SPECIES.

1. With only one sternopleural bristle..... .....2.
   With three or four sternopleural bristles.....**grandis** n. sp.
2. Wing with a black spot covering both cross-veins.....**opaca** Coq.
   Cross-veins with separate spots..... ....3.
3. Thorax black in ground color, with gray dust.....**maculata** n. sp.
   Thorax yellow in ground color, with yellowish dust.....**marginata** Lw.

Anorostoma grandis Darlington, n. sp.

Length 7.3 mm.; of wing, the same.

Large, blackish species, pulvilli long and conspicuous (in the male); hind femora exceptionally stout.

Occiput and front brownish; a black stripe extends from the ocellar bristles to the occiput; front densely pubescent below; cheeks straw yellow, about the width of the eye; eyes transversely oval; antennæ brownish, third joint oval; arista short, bare; face strongly receding below; vibrissæ one on each side, close together, rather delicate.

Thorax light brown; dorsum rather densely sprinkled with dark brown dots from which the small hairs arise, and with larger dark brown spots from which the bristles arise; scutellum reddish-brown, bare except the ordinary four bristles; besides the one propleural bristle a propleural hair; two bristles and a hair on the posterior margin of the mesopleura, which is otherwise bare; on the upper edge of the sternopleura is a row of from three to four strong bristles (three on one side; on the other four, two of which are a little smaller); sternopleura pubescent below.

Abdomen black, hypopygium yellow, globose.

Wings almost hyaline; the end of the auxiliary vein and the small and large cross-veins infuscated; the cloud on the small cross-vein is preceded and followed by whitish areas, and there is another of these on the costa beyond the end of the auxiliary, also a few faint ones in the base of the wing.

Legs yellow; front femora infuscated, middle femora comparatively slender, hind ones exceptionally stout; the last with a black spot near the distal end; all the pulvilli long and conspicuous, dirty white in color.

One male specimen. Aldrich: Pacific Grove, Cal., May 9th; collected in a wet meadow in the woods near the seashore about a mile south of Pt. Pinos Light.

Anorostoma opaca Coquillett.

"Head yellow, opaque, white pruinose, the front and upper part of the occiput tinged with bluish gray, a velvet-black spot between the antennæ and each eye, antennæ brownish, the arista marked before the middle with a white ring, palpi yellow, proboscis brown; body brown, opaque, bluish-gray pruinose, mesonotum with four, the pleuræ with one brownish pruinose vittæ; sternopleura bearing numerous short bristly hairs and with two stout bristles; legs yellow, opaque grayish pruinose, except a polished spot at base of the posterior side of the first two pairs and a streak on the posterior side of the hind ones; wings whitish, marked with large pale gray spots and with a black cloud covering the small and hind cross-veins, a small black spot beneath apex of auxiliary vein, one slightly before middle of antepenultimate section of the fourth vein, and several smaller spots on some of the other veins; the gray color fills the whole marginal cell beyond apex of auxiliary vein, nearly the entire second half of the submarginal, etc.; length 7 mm. A female specimen captured by the writer.

"*Habitat.*—Los Angeles County, Cal.

"*Type.*—Cat. No. 5500, U. S. N. M." Original description.

This species is not represented in the material examined. From its resemblance to *maculata*, it is probably a sand dune form, although nothing has been reported about its habits.

Anorostoma maculata Darlington, n. sp. (Pl. IV, figs. 4 and 5).

Length 4.5 mm.; of wing, the same.

General color gray, wings spotted, cheeks cream colored.

Occiput, vertex and front gray; lower part of the front somewhat yellowish and pubescent; the two pairs of vertical and three pairs of fronto-orbital bristles arise from brown spots; a rather broad brown stripe extends from the ocellar bristles to the base of the occiput; antennæ brown, third joint oval, arista white for about one-third its length at the proximal end; cheeks about one and a half times the width of the eye; eyes transversely ovate; a black spot connects the base of the antenna with the anterior somewhat angular margin of the eye; vibrissæ rather small.

Thorax gray; dorsum ash-gray; the dorsocentral bristles arise from large, distinct brown spots and the small hairs arise from small brown dots; the humeri, the lateral edges of the thorax, and the pleuræ, have a reddish-gray tinge; scutellum gray, bare except the ordinary four bristles, which arise from large brown spots, the apical pair confluent; the mesopleura has one large and one small bristle on the posterior edge, otherwise bare; the sternopleura with one strong bristle on the upper edge and with rather long, somewhat scattering pubescence below.

Abdomen gray, the small hairs arising from brown dots; hypopygium of the male gray, globose, and sparsely covered with very short pubescence.

Wings whitish, with large brown blotches; there is a blackish spot on the auxiliary vein at its tip, one on the small cross-vein, and a small one on the anterior end of the hind cross-vein, forming a straight row; the posterior end of the hind cross-vein also a little infuscated.

Legs pale yellow, except the femora, which are gray.

Twenty-one males and eleven females. Aldrich: Pacific Grove, Cal., May 9th.

This species is common on the sand dunes south of Point Pinos Light, on Monterey peninsula. It flies close down to the sand, resembling in its movements the drifting sand grains; when it alights, its mottled color blends perfectly with the sand. No information was gathered as to its food habits or its larval stages.

Anorostoma marginata Loew.

Length 5.4 mm.; of wing, 5.2 mm.

Head yellow; occiput clay-yellow, with a rather wide black stripe running up the middle to the vertex; front a little darker yellow, rather densely pubescent below; antennæ small, testaceous, third joint roundish, arista noticeably enlarged at base; face strongly receding below; face and cheeks straw-yellow; one vibrissa on each side of medium size.

Thorax yellow, varying to brownish, dorsum pubescent all over; the bristles arising from dots; scutellum yellow, bare except the ordinary bristles; mesopleura with one strong bristle and two smaller ones on the posterior edge, and a few small hairs on the lower anterior corner; sternopleura with one large and one smaller bristle on the upper edge, besides pubescence and strong bristles below.

Abdomen varying from yellow to brown; hypopygium of the male large, yellowish.

Wings yellowish; the cross-veins and the end of the auxiliary vein strongly infuscated, forming a straight line of three dots running diagonally across the wing.

Legs entirely straw-yellow, pulvilli of about the same color.

Fourteen males and twelve females. Daecke: Lucaston, New Jersey, May 30th; Brown's Mills, New Jersey, June 21st; Manumuskin, New Jersey, May 10th. Melander: New Bedford, Massachusetts, June 12th; Colorado. U. S. N. M.: Oswego, New York, July 1st (labeled *Anorostoma carolinensis* Desv.); Colorado. Cooley: East Flathead, Montana, July 25th. Johnson: Manumuskin, New Jersey, May 10th. Tucker: Tabernash, Colorado, August.

LERIA Desvoidy.

This genus includes all the members of the family having four dorsocentrals, except those three small groups which offer additional generic characters distinctly their own (*Œcothea*, with spines on the middle of the middle tibiæ: *Eucoptomera*, with very small eyes, and *Anorostoma*, with peculiar face and oral margin: thus *Leria* is a residual genus, not homogeneous, yet difficult to divide by satisfactory characters. The genus *Scoliocentra*, founded by

Loew to include forms with woolly hair and curved apical spurs on the middle tibiæ, we consider not sufficiently distinct, and allow it to lapse as a synonym, in part, of *Leria*. The characters apply mostly to the males, only with difficulty to the females, and there are intermediate forms. Loew himself states that *Leria iners* has curved spurs, and in Centuries, iii, 51 he mentions his own *Leria spectabilis* as a *Scoliocentra*.

Among other generic characters, the eyes are generally round, the antennæ short, with a round third joint, arista bare, either long or short; one humeral bristle; one propleural; two small prescutellar; scutellar bare, with the usual two pairs of bristles.

Leria specus Aldrich is a synonym of *Œcothea fenestralis*, as we find from an explanation of cotypes.

Leria carolinensis Desv. is insufficiently described, and we fail to identify it, but give a translation of the original description.

Leria tibialis, *geniculata* and *humeralis*, all described originally by Zetterstedt in northern Europe, are reported from Greenland by Lundbeck and part by earlier entomologists. The species, however, seem to be badly confused, as in Katalog der Paläarktischen Dipteren, iv, 47, 48, Becker disposes of them as follows: *tibialis* he makes a synonym of *serrata*, *humeralis* of *inscripta* Meig. (European), while *geniculata* is in part a synonym of *serrata*, and in part of *inscripta* Meig., another European species. This tangle should evidently be unraveled by European entomologists; for the present it is hardly worth while for us to quote the descriptions, as they all read much alike.

The remaining Lerias of the 1905 Catalogue are included in the following table, with the addition of *helvola* and *fraterna*, formerly referred to *Scoliocentra*, and of *glauca* new species, and *crassipes*, described as European. Specimens of all the species tabulated have been examined by us except *tristis* and *lutea;* of these we translate the original descriptions.

TABLE OF SPECIES.

1. Mesopleura hairy at least on the lower and hind part .....2.
   Mesopleura bare, at most with a few hairs close to the propleural bristle....4.
2. Mesopleura entirely hairy in the male, in the female the upper hind corner bare..... ..... **fraterna** Loew.
   Mesopleura hairy only on the lower and hind part.....3.
3. Abdomen black, hind margins of the segments reddish..**pubescens** Loew.
   Abdomen black, not banded .....**defessa** Osten Sacken.

4. Two or more sternopleural bristles.....5.
Only one sternopleural bristle.....6.
5. Color pale yellow.....**biseta** Loew.
Color black or brown.....**inera** Meigen.
6. Pteropleura with one bristle and several hairs (halfway between the sternopleural bristle and the root of the wing).....**pectinata** Loew.
Pteropleura bare.....7.
7. Thoracic dorsum yellow in ground color.....8.
Thoracic dorsum black in ground color, or mainly so.....10.
8. Large species (10 mm.), yellow, the abdominal segments sharply banded with black behind.....**helvola** Loew.
Small species (4 to 5 mm.), abdomen not so marked.....9.
9. Scutellum flat.....**lutea** Loew.
Scutellum convex.....**discolor** Loew.
10. Abdomen wholly dark yellow, contrasting with the thorax. **serrata** Linn.
Abdomen not wholly yellow.....11.
11. Femora and tibiæ wholly yellow.....12.
Femora and tibiæ partly blackish.....13.
12. With one vibrissa.....**tristis** Loew.
With two vibrissæ, the hind metatarsus of the male shortened. **latens** Aldrich.
13. Hind femora of the male with a comb of nine truncate black bristles below near the middle.....**cineraria** Loew.
Hind femora not so marked.....14.
14. Humeri yellow.....15.
Humeri not yellow.....**crassipes** Loew.
15. Arista short, not over twice as long as the body of the antenna. **leucostoma** Loew.
Arista considerably longer.....**glauca** n. sp.

Leria fraterna Loew.

Scoliocentra fraterna Loew, Centuries, iii, 51.

Leria fraterna Coquillett, Wash. Acad. Sci., ii, 457.

Chocolate-brown, with a slight glaucous coating and a dense covering of fine black hair on body and legs.

Head yellow, occiput and ocellar triangle brown, with a whitish pruinosity; front with numerous fine black hairs, extending down on the sides below the base of the antennæ; anterior fronto-orbital more than half as long as the posterior; cheeks fully half the height of the eyes, hairy on the lower half; palpi yellow; one vibrissa; antennæ reddish-brown, short, the arista of moderate length, thin, black.

Thorax chocolate-brown, with a whitish pruinosity, everywhere covered with soft, woolly black hair, except on the scutellum, metanotum, metasternum and posterior half of the pteropleura; all the bristles except the scutellar are more slender than usual, the anterior three dorso-centrals and the humeral almost imperceptible; the position of the dorso-central row on each side is marked by a faint, interrupted brown line; scutellum bare, yellowish-brown; halteres yellow; one sternopleural bristle.

Abdomen reddish-brown, with some irregular brown markings above, the last segment and hypopygium more yellow; very hairy, like the thorax; hypopygium small, turned forward under the preceding segment.

Legs brown, with the same woolly hair; preapical bristles of fore and hind tibiæ very slender; middle tibia with a stouter preapical bristle and a cluster of about five apical ones, of different sizes, the two or three largest distinctly curved; tarsi gradually infuscated, with large, whitish pulvilli.

Wings with a faint brownish cast, the veins near the base, and the subcostal cell yellowish; costal setæ of medium size.

Length 8 mm.; of wing, the same.

Female.—A little lighter in color, the hair everywhere shorter, and the bristles better developed, about as strong as in the average of the family.

Three females and two males. Aldrich: Moscow, Idaho, and St. Anthony Park, Minnesota. Johnson: Montreal, Canada, June 20th. U. S. N. M.: Ungava Bay, Hudson Bay Territory, L. M. Turner, Nos. 280 and 4186.

This is evidently a wide spread northern form; the type locality is Sitka, and it has been reported from White Mountains, New Hampshire.

Leria pubescens Loew.

Length of body 7.3 mm.; of wing, 8.1 mm.

Head, including the occiput, yellow; front entirely yellow, rather densely pubescent; vertical bristles rather long and stout; antennæ yellow, first two joints reddish-yellow; arista long and slender, only microscopically pubescent; vibrissæ one on each side, rather long and stout; cheeks straw-yellow, about three-fifths the width of the eye.

Dorsum of the thorax cinereous; the humeri and the lateral edges of the dorsum somewhat reddish; a rather distinct median brown line runs almost the length of the thorax; the dorso-central bristles arise from brown spots, which are almost confluent; the dorsum rather densely pubescent; scutellum reddish-yellow, bare except the ordinary four bristles; mesopleura reddish-brown, rather sparsely pubescent; besides one strong bristle, the sternopleura has rather dense and fairly long pubescence.

Abdomen brownish, densely covered with long, black pile; the posterior edge of each segment reddish-yellow; hypopygium of the male of medium size, yellow.

Wings with a brownish tinge; cross-veins very slightly infuscated; all the veins distinctly brown.

Legs reddish-yellow, densely pubescent all over; a rather long, brown spot at the apical end of the front tibia; last three tarsal joints of the front legs, the last two of the middle legs, and all those of the hind legs black.

One male, one female. Brues: Horseshoe Cave, Door County, Wisconsin, July 13th.

This species was reported from caves in Indiana; see note by Blatchley under *Œcothea fenestralis*.

Leria defessa Osten Sacken.

Length 5.5 mm.; of wing 6.2 mm.

Head yellowish; occiput brownish pollinose; front pale yellow, wholly pubescent; foremost fronto-orbital bristle about half the size of the posterior one; antennæ reddish-brown, third joint roundish, rather large; arista only microscopically pubescent; face receding; cheeks one-half the width of the eye; vibrissæ one on each side, rather strong.

Dorsum of thorax grayish-brown; the dorso-central bristles arise from large brown spots and the small hairs from smaller spots; a middle brown line runs almost the whole length of the thorax; humeri yellow; pleura rather dirty yellow; mesopleura rather sparsely pubescent; sternopleura, besides the one strong bristle, densely pubescent all over; scutellum bare except the ordinary four bristles, yellow.

Abdomen gray; halteres yellow; hypopygium of the male of medium size, yellow.

Wings with a brownish yellow tinge.

Legs yellow; front femora somewhat infuscated.

Four males and nine females. Melander: Indiana. U. S. N. M.: Cheat Mt. Cave, Files Creek, West Virginia; Boone's Cave, Hickman's Landing, Kentucky. Johnson: Niagara Falls, New York, June 28th.

This species was first described from a cave in Kentucky, and has been reported from other caves in Kentucky and Indiana. See note by Blatchley under *Ecothea fenestralis*.

Leria biseta Loew.

Length 5.7 mm.; of wing, 6.4 mm.

Yellow, abdomen somewhat infuscated; in general appearance resembles the genus *Helomyza*.

Head yellow, front lemon-yellow, lower part pubescent; antennæ reddish-yellow, third joint round, arista rather long, only microscopically pubescent; cheeks straw yellow, about three-fourths the width of the eyes, which are round, occiput entirely yellow, a tuft of small black hairs parted in the middle at the base of the occiput.

Thorax yellow, the dorso-pleural suture reddish, dorsum rather densely pubescent; scutellum lemon-yellow, bare except the ordinary four bristles; mesopleura bare except a few very small hairs on the anterior edge; sternopleura with two strong bristles of nearly equal size on the upper edge, also with sparse pubescence.

Abdomen blackish-yellow; the second, third and fourth segments with a black posterior margin; hypopygium of the male bright yellow, rather large and densely pubescent.

Wings large, with a brownish-yellow tinge; the hind cross-vein and the apices of the longitudinal veins distinctly bordered with brown; spines of the costa yellow.

Legs yellow, densely covered with black hairs; distal end of the hind femur black; the last four tarsal joints of the front legs black; pulvilli white, rather conspicuous.

One male specimen. Johnson: St. Johnsbury, Vt., June 26th.

This species was described from European material; it has since been reported from Sitka, and White Mountains, New Hampshire.

Leria iners Meigen.

Length of body 7 mm.; of wing 7 mm.

General color black; legs yellow, infuscated; hypopygium yellow; wings brown veined.

Front brown, pubescent; the occiput and a narrow area running forward, including the vertical triangle, black; cheeks yellowish-brown, about three-fourths the width of the eye; antennæ brown, third joint oval, the arista missing in the described specimen; vibrissæ one on each side, long.

Dorsum of the thorax grayish-black, covered with a yellowish pollen, densely pubescent all over, the small hairs arising from small black dots; scutellum same color as the thorax, entirely bare; pleuræ grayish-black; spiracle on the propleural suture conspicuous; a bunch of small black hairs on the mesopleura just above the front coxa, mesopleura otherwise bare.

Abdomen black, rather densely covered with long black hairs; hypopygium yellow.

Wings slightly brownish; wing veins distinctly brown; spines of the costa exceptionally long and sharp.

The outside of all the femora black except the ends, which are yellow; all the tibiæ and tarsi yellow; front tarsi flattened and widened from about the end of the second joint; spurs of the middle tibiæ curved.

One male. Aldrich: Moscow, Idaho.

A European species hitherto reported from North America but once, without locality.

Leria pectinata Loew.

Length of body 4.7 mm.; of wing 4.4 mm.

Head yellow; front somewhat saffron-yellow, pubescent; orbits of the eyes whitish; the occiput, a portion of the vertex surrounding the fronto-orbital bristles and the vertical triangle black; antennæ reddish-yellow, third joint brownish or brownish-black; arista long and slender, bare; cheeks about three-fourths the width of the eyes, somewhat clay-yellow; vibrissæ rather strong.

Dorsum of the thorax cinereous, rather densely covered with black pubescence; pleuræ entirely gray; propleura with three or four hairs besides the one strong bristle over the fore coxa; mesopleura entirely bare: pteropleura with a distinct bristle and several hairs (this seems to be one of the best marks of distinction); sternopleura covered with dense pubescence, and with one bristle; scutellum bare, yellowish.

Abdomen cinereous, the posterior margins of the segments usually yellowish, sometimes entirely cinereous; hypopygium of the male also yellowish.

Wings somewhat brownish, veins entirely brown.

Legs testaceous; front femora somewhat infuscated; tarsi brownish; the front metatarsus in the male with an enlarged lower apical margin, quite distinct when seen from the proper angle.

Seventeen females and four males. Aldrich: Brookings, South Dakota, June 11th; Moscow, Idaho. Melander: Austin, Texas, November 16–19th. U. S. N. M.: Mesilla Park, New Mexico, February 18th. C. F. Baker: Pine Lake, California.

The species was originally described from Texas; it has been reported from "upper burrows of desert rodents" in Arizona. Professor Melander informs me that he collected it at Austin, Texas, in a novel manner: he buried wide mouthed bottles up to the neck in ant hills, left them over night, and on approaching next morning slipped a cork in before the flies had time to be disturbed.

Leria helvola Loew.

Scoliocentra helvola Loew, Centuries, ii, 80.

Male.—Yellow, the largest of the family, with large yellow wings.

Head yellow, the lower half deeper yellow, sharply limited above; face receding, oral margin not very distinct, one strong vibrissa; cheeks one-third the height of the eye; antenna short, yellow, with long, thin arista.

Thorax yellow, bristles fairly well developed, dorsum with rather dense black hair; pleuræ bare except the sternopleura, which is covered with fine, black hair and has one bristle; scutellum bare, lighter yellow than the rest of the dorsum, with the usual bristles; halteres yellow.

Abdomen yellow, with dense black hair, hind margins of the segments narrowly blackish (less distinct than in the female); hypopygium small and inflected; halteres yellow.

Legs yellow, including all the tarsi; preapical bristles slender on front and hind tibiæ; middle tibiæ with stouter ones, and a cluster of several apical ones, the larger ones distinctly curved; front tibiæ with a row of bristles above and one below; hind tibiæ with a short row above near the apex: pulvilli rather large, whitish.

Wings large, yellow, the posterior cross-vein and the tips of the three veins in the apex margined with brown; a distinctly yellower tinge accompanies all the veins, last section of fifth vein only one-third as long as the posterior cross-vein; costal setæ strong.

Length 8.5 mm.; of wing 9.5 mm.

Female.—Paler yellow, less hairy, bristles larger, distinct narrow black borders behind on the second, third, fourth and fifth abdominal segments.

One male, five females. Aldrich: a pair from Ithaca, New York, June 5 and July 6, 1897, which were originally in the collection of Cornell University. Daecke: Orange Mountains., New Jersey, August, a female collected by Weidt. U. S. N. M.: White Mountains, New Hampshire. Johnson: North Mountain., Pennsylvania, August 28, 1897, and Elkhard, Indiana.

Originally described from Illinois, but the distribution is rather eastern.

Leria discolor Loew.

Length of body 5.4 mm.; of wing 4.6 mm.

General color yellow; abdomen somewhat darker.

Head yellow; front saffron-yellow, wholly pubescent; antennæ same color, third joint round; arista noticeably enlarged at base, the base yellow, remainder black, only microscopically pubescent; cheeks about one-half the width of the round eyes, straw yellow; vibrissæ one on each side, rather large and strong; orbits of the eyes somewhat silvery pollinose.

Thorax yellow; dorsum densely pubescent with black hairs; scutellum bright yellow, bare except the ordinary four bristles; mesopleura yellow, bare except three or four small hairs at the lower anterior corner; sternopleura with one strong bristle and about five small hairs on the upper edge, also numerous hairs on the lower part.

Abdomen yellowish-brown; hypopygium of the male yellow, of medium size.

Wings unspotted, almost hyaline; wing veins yellow; spines of the costa rather small.

Legs yellow; tarsi somewhat darker; pulvilli dirty white, rather conspicuous.

One male and three females, from the type locality. U. S. N. M.: Mt. Washington and White Mountains, New Hampshire.

Leria serrata Linn.

Length 5.3 mm.; of wing 5.9 mm.

Head yellow, occiput black; front saffron-yellow above, lighter below, densely pubescent; first two joints of the antennæ yellowish-brown; third joint black, arista long, only microscopically pubescent; cheeks yellow, three-fourths the width of the eye; more than one vibrissæ on each side.

Thorax ash-gray, densely pubescent; a narrow brown stripe runs down the middle, with a wider one on each side, from which the dorso-central bristles arise; scutellum ash-gray, bare except the ordinary four bristles; mesopleuræ bare except a few small hairs at the lower anterior corner; sternopleura, besides the one strong bristle, with rather dense pubescence.

Abdomen wholly reddish-yellow or saffron-yellow, hypopygium of the male of the same color, small.

Wings grayish translucent, veins yellowish-brown.

Legs yellow; front femora infuscated on the outside; last three or four tarsal joints of all the legs blackish.

Nine males and nine females. Cooley: Bozeman, Montana, May 27th to July 7th. Melander: Mayfield Cave, Bloomington, Indiana. Brues: Horseshoe Cave, Door County, Wisconsin, July 13th. Aldrich: Moscow, Idaho.

The preceding species is very similar in appearance to *Tephrochlamys rufiventris;* it can be distinguished by having four dorso-central bristles, shorter antennæ and more bristly epistoma.

The earliest described species of the family; common in many parts of Europe as well as North America; frequently collected in caves, also on windows of houses. According to Brauer, the larvæ have been bred from fungi and from hen manure.

Leria latens Aldrich.

Brownish-black, the head, knees, venter and tip of abdomen reddish; two vibrissæ on each side.

Length 4.8 mm.; of wing 5 mm.

Front saffron-yellow; occiput, a narrow stripe including the fronto-orbital bristles, and a broader area including the vertical triangle, black; first two antennal joints reddish-yellow, third joint black, arista long, only microscopically pubescent; cheeks yellow, about three-fourths the width of the eye; two strong vibrissæ on each side, the front one somewhat the longer.

Thorax black, dorsum rather densely pubescent; scutellum black, bare except the ordinary four bristles, which are rather unusually long; mesopleura black, bare; sternopleura with a row of four or five unequal bristles on the upper edge, pubescent below.

Abdomen black; the venter and the posterior border of each segment and all the fifth segment reddish-yellow in the female; hypopygium of the male yellow, of medium size.

Wings grayish, almost hyaline, unspotted; veins brown; spines of the costa rather small and inconspicuous.

Coxæ and femora black, hairy, the latter stout; trochanters and knees red; tibiæ usually with considerable red or reddish-yellow color, especially near the middle; tarsi almost uniformly brown.

Three males and three females. Aldrich (cotypes): Porter's Cave, Indiana, July 14th. Milwaukee Public Museum: Horseshoe Cave, Door County, Wisconsin, July 13th. Melander: Austin, Texas, January 20th.

See note by Blatchley under *Œcothea fenestralis*.

Leria cinereria Loew.

Length of body 6.2 mm.; of wing 7.7 mm.

Ash-gray; a comb of about nine strong, blunt bristles on the hind femora of the male.

Head yellowish; occiput gray, the gray portion extending forward on the edges so as to include the fronto-orbital bristles, and in the middle so as to include the vertical triangle; front from saffron-yellow above to lemon-yellow below, rather densely pubescent; eyes round, about twice the width of the cheeks; antennæ brown, first two joints yellowish-brown; arista long, nearly bare; vibrissæ long and rather stout.

Thorax ash-gray; dorsum pubescent, the small hairs arising from distinct brown dots, the bristles arising from larger brown spots; upper surface of the scutellum gray, but yellowish on the margins, bare except the ordinary four bristles; mesopleuræ bare except three or four hairs on the lower anterior corner, just above the front coxa; sternopleuræ with one strong bristle and four or five smaller hairs on the upper edge, besides numerous hairs on the lower part.

Abdomen gray, hypopygium of the male yellow, medium sized; in the female the last two segments are reddish-yellow and the ventral side of the abdomen is reddish-brown.

Wings hyaline except the subcostal cell.

Legs pale yellow, tarsi brownish; hind femora of male with a comb of about nine strong, blunt, black bristles on the inner or hind side.

Two males and three females. Aldrich: Moscow, Idaho, June 7th.

NOTE.—Our specimens agree with Loew's description in every particular, except that he says that the dorsum of the thorax is unspotted, while in all of these it is distinctly spotted.

Leria crassipes Loew.

Loew, Zeitsch. f. Ent. xiii, 68 (*Blepharoptera*).—Germany.

Male.—Rather small, dark grayish, the large hypopygium and the legs testaceous, the coxæ and the chest between them with very dense pile. Length 5–5.2 mm.; of wing 5.2–5.3 mm.

Blackish-gray. Front somewhat narrower than in most of the other species. Occiput and vertex blackish-gray. The anterior of the two fronto-orbital bristles rather strong. Antennæ reddish-yellow or yellow, the third joint sometimes brown on a great part of its outer side; arista rather short, with pubescence somewhat more noticeable than in other species. Eyes large, rounded; cheeks of only moderate breadth; vibrissæ one on each side, long. Thorax with quite dense and rough hair; an extremely small dot at the base of each hair; between the dorso-central rows of bristles are two faint brownish-black lines, generally much abbreviated in front; on each side are two spots of the same color, still fainter, one before and one behind the suture, the latter one larger. Scutellum concolorous with thorax. Pleuræ more pure cinereous than the dorsum, sometimes somewhat brownish; only one sternopleural bristle, but the row of hairs in front of it are somewhat strong and bristle-like, so that one or two of them may approach the size of bristles; mesopleura bare; between the middle and hind coxæ with dense and stout bristles. Abdomen blackish cinereous, the hind margins of the segments often brownish-red or almost testaceous. Hypopygium brown-yellowish or more red-yellowish, large and thick, with sparse hair. Legs brownish-yellow, densely hairy; tarsi infuscated; femora very strong, the front ones with many bristles; on the underside of all the femora are only the usual hairs, but very dense. Wings with a perceptible tinge, more gray-brown than yellow-brown; subcostal cell narrow; bristles of the costa numerous.

The preceding is a translation of the entire original description. We have two female specimens, sent us under this name from the United States National Museum, from Ungava Bay, Hudson's Bay Territory, Nos. 4116 and 4186, collector L. M. Turner. The description applies very well, only as these are females the pilosity is not so strong as described, especially on and between the coxæ; the row of hairs on the sternopleura, while rather large, do not approach the stature of bristles. The specimens having been in alcohol, it is impossible to say much about the lines and dots of the thorax. The species was described from Europe, and this is the first published reference to its occurrence in North America.

Leria leucostoma Loew.

Length of body 3.7 mm.; of wing 4.4 mm.

Vertex and occiput gray; front saffron-yellow; antennæ brownish yellow, third joint round, arista black, only microscopically pubescent; orbits of the eyes whitish; face somewhat cream colored, cheeks about one-third the width of the eye; eyes round; vibrissæ one on each side, rather strong.

Dorsum of the thorax ashy gray, rather densely pubescent; dorso-central bristles rather slender; humeri conspicuously reddish-yellow; propleuræ reddish-yellow; mesopleuræ gray except the margins, which are yellow, bare; sternopleuræ yellowish, one strong bristle and four or five hairs on the upper edge; scutellum yellow, bare except the ordinary four bristles.

Abdomen from yellow to brown, each segment with a silvery posterior margin; hypopygium yellow, of medium size.

Wings entirely hyaline; spines of the costa small.

Legs yellow; all the tarsi and the distal end of the tibiæ brown.

Three male specimens. Johnson: Hampton, New Hampshire, May 25th and September 12th. Aldrich: Mt. Constitution, Washington, July 7th. U. S. N. M.: White Mountains, Morrison.

Leria glauca Aldrich, n. sp.

Length 6.1 mm.; of wing 7.5 mm.

Occiput, vertical triangle and thorax, except apical part of scutellum, of a smooth glaucous gray color, much as in *Tephrochlamys rufiventris* and *Leria serrata*. Remainder of head reddish-yellow, third joint of antenna infuscated, the arista long and slender. Cheek fully half the width of the eye. A single vibrissa, the hairs behind it small.

Bristles of the thoracic dorsum long, the intervening hairs fine and short; the bristles are seated on blackish dots; a slender median brown line on the dorsum, abbreviated at both ends; scutellum yellowish on the apical part, flat and bare, with the usual four bristles; pleuræ concolorous with dorsum, mesopleura and pteropleura bare, except a few hairs on the former in its lower front corner; sternopleura with one bristle and covered with fine hairs, which become larger below. Halteres yellow.

Abdomen dark yellow in ground color, but considerably blackened above except near the apex; hind margins of the segments lighter except the first.

Legs including coxæ yellow, the tarsi darker toward the tip; claws and pulvilli large; hind metatarsus with two bristles below near the base.

Wings hyaline, long and wide.

A single female, Pullman, Washington, April 16, 1904, from Professor Melander.

The species has a marked resemblance to *serrata*, but the abdomen is considerably black above, the hairs in the vicinity of the vibrissa are small; the anterior fronto-orbital bristle is very small, while in *serrata* it is nearly as large as the one behind.

Leria lutea Loew.

"Male and female. Wholly ochraceous, opaque, tarsi brownish toward the apex, arista only slightly pubescent, one strong vibrissa on each side, mesopleura bare, scutellum bare except the usual bristles; all the femora stout; hypopygium of the male small; wings a little cinereous, spines of the costa minute.

"Related to *Leria inscripta* and *crassipes*. Entirely ochraceous, opaque. Antennæ concolorous, first two joints very short, third rather large, round, with a slender, almost bare blackish arista. Eyes roundish. Cheeks rather broad. One stout vibrissa on each side. Mesopleura bare; one sternopleural bristle. Segments of the abdomen subequal, the middle ones sometimes brown or black, except the hind edges. Hypopygium of the male small, concolorous. Coxæ and mesosternum with black pile. Legs ochraceous, the femora stout, tarsi brownish toward the apex. Wings yellowish subhyaline, brown toward the apex and hind border, spines of the costa small. (Sitka; Sahlberg)." Entire description translated.

This species we are unable to recognize in our material; the reference to *inscripta* raises the suspicion that the *geniculata* from Greenland may be this species, and this may really be identical with *inscripta*. On this we have no evidence.

Mr. Fyles has reported *lutea* from Quebec.

Leria tristis Loew, Centuries, ii, 84.

Female.—Small, blackish-gray, head yellow, antennæ brownish-black, seta short, nearly bare; legs black; wings grayish hyaline, spines of the costa sparse and small. Length 3¼ mm.; of wing 3½ mm.

Blackish-gray. Head yellow, occiput and vertex blackish-gray. Antennæ brownish-black, first two joints brown, third round, arista short, nearly bare. Eyes rather large, round; cheeks rather small; face receding below, vibrissæ rather small. Pleuræ and scutellum bare except the ordinary bristles. Legs entirely black. Halteres pale yellowish. Wings ashy hyaline, the stigma very pale brownish; veins blackish, spines of the costa scattered and small. (Winnipeg; Kennicott.) Translation of entire description.

This species is not among those we have examined. It has, however, been seen from the Commander Islands, Alaska, by Coquillett, and is also reported from New Jersey by Johnson in Smith's Catalogue of the Insects of New Jersey.

Scatophaga carolinensis Desvoidy, Myodaires, 629.

(Referred to *Leria* in Ann. Soc. Ent. France, 1841, 258.)

"Nigro-subcinerea; facie alba; frontalibus rubris; pedibus fulvis, alæ subflavescentes."

Length 8 mm. This species, lacking the antennæ, may belong to a different section, but it shows most of the characters of a *Scatophaga*.

"All the body brownish-black, with a very light cinereous covering; face white; frontalia fulvous, broad anteriorly; legs yellow, with a little dark brown on the femora; wings with a light yellowish tinge, markings little developed.

"This species, coming from Carolina, was given me by M. Bosc under the name *Musca flavescens*."

Entire description translated into English except the diagnosis. We are unable to identify the species with certainty or plausibility from the vague characterization. Perhaps it was really a *Sciophaga*, as the redness of the front would indicate.

A pair of specimens from the U. S. N. M., locality Oswego, New York, came to us under this name, while others, not specifically distinct, from Colorado were labeled *Anoxotoma marginata*, we think correctly.

MELOMYZA Fallen.

Humeral bristle absent; propleural absent; five dorso-centrals; three supra-alar; two noto-pleural; one presutural; scutellar two pairs; one fronto-orbital; one sternopleural. Face with distinctly projecting oral margin; antennæ with somewhat elongated third antennal joint, the arista in most cases more or less plumose. Wings large, in the majority of cases with markings, which usually border the cross-veins and the apices of the longitudinal veins.

In this genus the transverse suture of the thorax runs obliquely forward from its origin at the side, so that the portion behind it is larger than usual; four of the five sternopleural bristles are behind the suture.

The species are as a rule rather large, yellow, somewhat elongate forms, easily distinguished by the absence of humeral and propleural bristles, together with the large number of five dorso centrals.

We have seen all the species of the table except the Mexican forms and *apicalis*: the descriptions of these, together with those of Walker's two supposed species, are reproduced at the end of the genus.

TABLE OF SPECIES.

1. Arista plumose ..... 2.
   Arista bare or merely pubescent ..... 7.
2. Mesopleura bare ..... 3.
   Mesopleura with hairs ..... 6.
3. Cheeks more than one-third the eye height ..... 4.
   Cheeks less than one-third the eye height ..... 5.
4. Scutellum pilose ..... **longipennis** Loew.
   Scutellum with only a very few scattering hairs ..... **plumata** Loew
5. Scutellum bare ..... **limbata** Thomson
   Scutellum pilose ..... **quinquepunctata** Say.
6. Ocellar knob black, face with narrow silver-white latera. margins Mexico. **punctulata** Van der Wulp
   Ocellar knob not black, and no silver-white margins of face. **nemorum** Meigen.

7. Blackish spots of different sizes in all the cells of the wing (Mexico).
polystigma Van der Wulp.
A rounded dot between the second and third veins (Mexico).
distigma Van der Wulp.
A black spot on each side of the ocellar spot (Mexico)....**iniens** Giglio-Tos.
Without the above characters.....8.
8. Wings entirely hyaline .....**zetterstedti** Loew.
The transverse veins and apices of longitudinals distinctly infuscated.....9.
9. Scutellum except the sides bare .....**apicalis** Loew.
Scutellum pilose .....**barberi** n. sp.

Helomyza longipennis Loew.

Length 8.1 mm.; of wing, the same.

Large, rather pale yellow to reddish-yellow species, marked with a blackish triangle on each of abdominal segments two to five; this triangle as wide as the segment and occupying all its posterior part, the apex of the triangle pointing cephalad and indistinctly approaching the next preceding segment.

Head bright yellow, front wide, with one fronto-orbital on each side; antennæ short, the third joint a little elongated; arista with short but dense plumosity; face and cheeks pale yellow; vibrissæ small; cheeks hardly half as high as the eye.

Dorsum of thorax testaceous, not dotted; scutellum flat, pilose above; mesopleura bare; sternopleura with one strong bristle, and a few delicate yellow hairs, the lower part with longer mostly yellow hairs.

Abdomen lighter yellow, marked with black as indicated above; hypopygium small, yellow; venter in the male with long yellow hair.

Legs yellow, femora in the male stout, all with a row of spines on the outer side, and abundant, long yellow hair on the lower part; last two joints of the tarsus black.

Wings yellowish, large and broad, the cross-veins and tips of longitudinals with only a trace of infuscation, strongest on the hind cross-vein.

Three males and one female. Johnson: St. Johnsbury, Vermont, June 27th; Delaware Water Gap, New Jersey, July 11th; North Mountain, Pennsylvania, August 28th. Daecke: Bloomfield, New Jersey, September (Weidt).

The type locality was New York, and the species had been reported from New Jersey by Johnson in Smith's Catalogue.

Helomyza plumata Loew.

Length 4.6–5.2 mm.; of wing 5.9 mm.

General color pale yellow; legs somewhat lighter colored; five brown spots on the wing.

Head yellow; eyes medium sized, roundish; front saffron-yellow, lower part densely pubescent; antennæ same color or slightly darker, third joint oval; arista rather long, plumose; cheeks about half as wide as the eyes, paler than the front; vibrissæ rather small.

Dorsum of thorax saffron-yellow; besides the ordinary bristles it is densely pubescent all over, the small hairs arising from small brown dots; humeri lighter in color; mesopleura pale yellow, entirely bare; sternopleura pale yellow, with several small hairs besides the one strong bristle; scutellum thinly hairy and with the usual four bristles.

Wings slightly yellowish; small and large cross-veins and the apices of the longitudinal veins distinctly bordered with brown.

Abdomen yellow, each segment with a blackish posterior border; hypopygium of male large, brighter yellow.

Legs light yellow.

Eight male and seven female specimens. Aldrich: Knoxville, Tennessee (Summers); Battle Creek, Michigan; South Dakota, July 2nd. U. S. N. M.: Oswego, New York; Milwaukee County, Wisconsin, July 15th. Johnson: Philadelphia, Penna.; Delaware Water Gap, New Jersey; Montreal Island, Quebec; Auburndale, Mass.; Burlington, Vermont, and Ft. Collins, Colorado; dates from June 25th to August 14th. Melander: Wisconsin (Wheeler); Angora, Penna., September 17th.

The type locality was New York.

Helomyza limbata Thomson (Pl. IV, fig. 6).

Length 5.3 mm.; of wing 6.2 mm.

General color pale yellow; legs a little lighter; wings strongly infuscated.

Head yellow; eye large, round; vertex and upper part of the front saffron-yellow, lower part of the front lighter yellow, densely pubescent; ocellar triangle also pubescent; antennæ pale yellow, third joint oval; arista of moderate length, plumose; vibrissæ of medium size, one on each side; cheeks narrow.

Thorax entirely pale yellow, dorsum densely pubescent; mesopleura bare; sternopleura with one strong bristle and numerous small black hairs; scutellum saffron-yellow, bare except the ordinary four bristles and an occasional small hair near the margin.

Wings with the marginal and usually the first submarginal cell distinctly infuscated, also the ends of all the longitudinal veins; both cross-veins distinctly bordered with brown.

Abdomen of the female nearly black, that of the male not nearly so dark, but with a black band on the posterior edge of each segment; hypopygium of the male large, yellow.

Legs straw-yellow; hind knees blackish.

Five male and nine female specimens. Aldrich: San Mateo, Palo Alto and San José, California, January 26th to April 12th; Orcas Island, Guemes Island, and Keyport, Washington, July 7th to August 7th.

Type locality, California.

Helomyza quinquepunctata Say.

Helomyza latericia Loew, Centuries, ii, 89.

Length 5.7–6 mm.; of wing 6 mm.

General color yellow, the large and small cross-veins and the apices of the longitudinal veins distinctly bordered with brown; scutellum entirely pilose; eyes large, ovate.

Front saffron-yellow, broader at the vertex than at the antennæ; face lighter yellow, broadening from the antennæ down; antennæ yellow, third joint large,

oblong-ovate, with plumose arista; cheeks narrow, pale yellow; vibrissæ one on each side, of medium size. At the base of the occiput is a tuft of black hair parted in the middle.

Dorsum of thorax with numerous small brown spots, out of which arise the small hairs; ground color saffron-yellow; mesopleura entirely bare, somewhat paler yellow; sternopleura with one strong bristle and numerous small hairs below; scutellum the same color as the thorax, wholly pilose.

Wings slightly brownish, the front and hind cross-veins and the apices of the longitudinal veins distinctly bordered with brown.

Abdomen yellow, the hind margin of each segment black; hypopygium of the male rather small.

Legs straw-yellow, the last three tarsal joints of all the legs black; preapical bristles of the tibiæ long and slender.

Four female and one male specimens. Aldrich: Battle Creek, Michigan. U. S. N. M.: Southern Georgia. Johnson: Opelousas, Louisiana, March to May (Hough).

Type locality, Connecticut; it has also been reported from the White Mountains of New Hampshire by Mrs. Slosson.

This species was redescribed by Loew as *H. latericia*, but in a note appended to the description he says he should have identified it with *quinquepunctata* had not Say asserted the antennæ of the latter to be five-spotted. This was a mistake on the part of Loew, since Say said nothing of the kind, but located the spots on the wing.

(In my Catalogue I made Loew's *plumata*, instead of *latericia*, a synonym of *quinquepunctata*; this I am now satisfied was due to some confusion of names, as *latericia* is clearly the synonym.—J. M. A.)

Helomyza nemorum Meigen, Syst. Beschr., vi, 52.—Europe. Loew, Zeitsch. f. Ent. Bresl., xiii, 22. Schiner, Fauna Austr., ii, 28. Czerny, Wien. Ent. Ent. Zeit., xxiii, 223.—Europe and North America.

Helomyza assimilis Loew, Centuries, ii, 87.—Hudson's Bay Territory.

Length 5.9 mm.; of wing 6.4 mm.

General color yellow; small and large cross-veins, and the apices of the longitudinal veins distinctly bordered with brown; mesopleura pubescent.

Head yellow; front saffron-yellow, lower part pubescent; antennæ saffron-yellow, third joint rather large, oval; arista long, plumose; eyes roundish, about two and a half times the width of the cheeks; cheeks straw-yellow.

Dorsum of the thorax densely pubescent, the small hairs arising from small brown dots; ground color saffron-yellow; mesopleura with numerous small black hairs; sternopleura besides one strong bristle with numerous small black hairs; pleura yellow; scutellum saffron-yellow, wholly pilose.

Wings slightly brownish; the costal and subcostal cells strongly infuscated; the cross-veins and the apices of the longitudinal veins distinctly bordered with brown; spines of the costa rather long.

Abdomen yellowish, but more or less infuscated; hypopygium yellow, rather large.

Legs straw-yellow; fore femora stout; last three joints of all the tarsi black.

Four male and three female specimens. C. F. Baker: Ormsby County, Nevada, July 6th. Aldrich: San Juan Island, Washington, May 31st; Juliaetta, Idaho, July 9th; Moscow, Idaho; Craig's Mt., Idaho; Colorado (E. S. Tucker).

Loew did not identify *nemorum* from North America, but named our species *assimilis*, stating that it did not differ from *nemorum*, except in having a little shorter plumosity of the arista and general paler color; Czerny identified his American material as *nemorum*, and did not identify *assimilis*, merely quoting the description (*op. cit.*, p. 222). From these facts I feel safe in making *assimilis* a synonym of *nemorum*.

Helomyza zetterstedti Loew.

Length of body 5.6 mm.; of wing 6.9 mm.

General color yellow; wings hyaline.

Front leather-yellow, lower part pubescent; eyes medium size, round; cheeks straw-yellow, about two-fifths the width of the eye; antennæ yellow, third joint rather large, somewhat infuscated, oval; arista rather long, not plumose, but merely pubescent; vibrissæ of medium size; at the base of the occiput is a bunch of small black hairs.

Thorax yellow; dorsum clay-yellow, rather sparsely pubescent; the small hairs not arising from dots; mesopleuræ clay-yellow, bare; besides one strong bristle a few scattering small hairs on the sternopleuræ; scutellum yellow, bare.

Wings entirely hyaline.

Abdomen blackish yellow, hypopygium of the male bright yellow, rather large.

Legs yellow, femora lemon-yellow, tibiæ and all but the last two joints of the tarsi straw-yellow, last two tarsal joints black, inner side of hind and middle femora glabrous, at the apex of the femur is a black spot on the inner side.

Fifteen female and eight male specimens. Aldrich: Mt. Constitution, Washington, July 7th; Friday Harbor, Washington, May 29th. U. S. N. M.: Popoff Island, Alaska, July 8th.

Helomyza barberi n. sp.

Length 5.8 mm.; of wing 6.3-7 mm.

General color brown, wings brownish, a brown ring or spot at each end of the hind tibia and at the distal end of the front tibia.

Head yellowish; front ochre-yellow except a brownish strip running down from the vertex on each side including the fronto-orbital bristles, and a wider brown area in the middle including the ocellar triangle; all the yellow portion of the front pubescent, a strip of small black hairs extending from the ocellar bristles to the vertical bristles; antennæ yellowish-brown, third joint oval, arista long and slender, only microscopically pubescent.

Dorsum of the thorax yellowish-brown, wholly pubescent, the small hairs arising from small brown dots, the bristles arising from larger brown spots; in

the darker specimens a central brown stripe runs the full length of the thorax; scutellum pubescent, except a bare strip in the middle; pleuræ clay-yellow; mesopleura with numerous strong hairs; sternopleura besides the one strong bristle with numerous small hairs.

Wings brownish; costa, small and large cross-veins, and apices of the longitudinal veins distinctly bordered with brown.

Abdomen yellowish cinereous or totally cinereous; hypopygium of the male brownish-yellow, rather small.

Legs yellow, somewhat infuscated; all the tibiæ with a brown band at the distal end, and the hind tibiæ with an additional one near the base, these rings when feebly developed sometimes appearing as spots on the outer side; last two joints of the tarsi black; pulvilli white and rather conspicuous.

Three females, one male. U. S. N. M.: Las Vegas, N. M., Aug. 13th and 14th (H. S. Barber), labeled *Helomyza tincta* Walk. Aldrich: Custer, So. Dakota. Cooley: Missoula, Montana, May 28th.

The type is a male from Las Vegas, and will be returned to the National Museum.

Species not Identified.

Helomyza apicalis Loew.

"Yellow, the transverse veins and the apices of the longitudinal ones distinctly bordered with brown, upper half of the pleura [mesopleura] with some scattered minute pile, antennal arista with short pubescence.

"Yellow, opaque, the color of the thorax and scutellum verging more into latericious. Front brighter yellow. Antennæ almost fulvous, the third joint ovate, arista with short pubescence. Eyes rather large, roundish; the cheeks of medium width; one vibrissa on each side, of medium size. Dorsum of the thorax sprinkled with very minute brown dots, the bristles of the median part surrounded at base with brownish dots a little larger. Scutellum bare except at the sides. Pleura with a faint stripe, the upper half bearing some minute pile. Hind margin of each abdominal segment bordered with blackish. Legs lutescent, the apices of the hind femora and bases of all the tarsi brownish, apices of the tibiæ brown, tarsi black at tip. Wings cinereous-hyaline, transverse veins and apices of the longitudinal ones distinctly bordered with brown, costal bristles of medium size.—(District Columbia; Osten Sacken)."

Translation of original description.

Helomyza tincta Walker. Female.

"Body ferrugineous, clothed with short, black hairs; head and chest beset with a few black bristles; head with a hoary tinge behind; sides of the face without bristles; epistoma not prominent; eyes pitchy; facets small; sucker pitchy, clothed with tawny hairs; palpi tawny, beset with black bristles; feelers tawny at base; abdomen linear, pitchy, a little narrower and very much longer than the chest, tawny at the base, tapering toward the tip, which is also tawny; legs pale ferrugineous, clothed with short black hairs; tips of the shanks beset with black bristles; claws black, ferrugineous at the base; foot-cushions pale tawny; wings gray, tawny for some breadth beneath the fore border and among the veins in the disk; wing-ribs and veins tawny; longitudinal veins straight;

middle cross-vein straight, upright; lower cross-vein straight, very slightly oblique, parted by more than twice its length from the middle cross-vein, by thrice its length from the end of the fourth longitudinal vein, and by near half its length from the end of the fifth longitudinal vein; poisers tawny; scales yellow, very small.

"Length of the body 3¾ lines; of the wings 6½ lines.

"Nova Scotia. From Lieut. Redman's collection."

Helomyza fasciata Walker.

"Body clothed with black hairs and bristles; head gray, adorned with white reflections on each side of the crown and on the fore part, which is tawny; sides of the face without bristles; epistoma not prominent; eyes red, convex; all the facets very small; sucker black, clothed with tawny hairs; feelers black, nearly as long as the face; third joint slightly conical, rather deep, rounded at the tip, very much longer than the second joint; first and second joints dark ferruginous; bristle bare, rather stout at the base, more than twice the length of the third joint; chest and breast gray; chest with a tawny tinge; shoulders ferruginous, breast more hoary; abdomen tawny, shining, spindle-shaped, a little longer than the chest, slender at the tip; sutures of the segments black; legs tawny, clothed with black hairs and bristles; feet black, tawny at the base; foot-cushions very small; wings pale gray, with a very slight tawny tinge; wing-ribs pale tawny; veins pitchy, pale tawny toward the base; lower cross-vein parted by much less than twice its length from the middle cross-vein, having two very indistinct curves, the lower outward, the upper inward; scales very small, whitish, with pale yellow borders; poisers tawny.

"Length of body 2 lines, wings 4 lines.

"Nova Scotia. Lieut. Redman's collection."

The two descriptions immediately preceding, by Walker, need not give the student much trouble. They are inserted merely for completeness, and to satisfy any curiosity which might arise, but not with the expectation that they will be identified. In fact, one would almost certainly go wrong in identifying a species under either name, no matter how well the description fit. Czerny (*op. cit.*, pp. 202–205) has reported the results of his examination of Walker's types of Helomyzidæ; out of 36 cases examined, there was *not one* that even belongs in this family, the types being mostly Sapromyzidæ, with an admixture of Trypetidæ, Anthomyidæ, etc. However, he does not say anything about *tincta*, and reports *fasciata* lacking in the Museum. Hence we have not even the satisfaction of positively excluding them from the family.

Two specimens of *barberi* were received from the U. S. National Museum under the name *tincta* Walker, but it is probable that the name was applied before Czerny published his results; at any rate we do not accept it.

Helomyza iniens Giglio-Tos.

"Yellowish-testaceous; the face pale yellow, third antennal joint almost circular, black at base and on the upper margin; arista long, plumose; thorax ochraceous, dotted with brown; pleura pale yellow; scutellum ochraceous, with two brown vittæ and four bristles; abdominal segments bordered with brown behind; legs in the male stout and hairy; bases and apices of the tibiæ annulate with black; tarsi black at apex; wings yellowish, costa with spinules, the front margin, transverse veins and apex of the fourth longitudinal vein brown. Length 9 mm."

Translation of original description. The type locality was simply Mexico. In his later description Giglio-Tos adds that there is a black spot each side of the ocellar spot; plumosity of the arista medium; pleura with a brownish stripe; all the femora with an apical brown spot above; hind tibiæ with a black ring near the base; apices of all the tibiæ and last four joints of all the tarsi black.

Van der Wulp, in his Biologia reference, calls attention to a few points. The most striking character is the infuscation upon the hind cross-vein, which extends both ways along the fourth vein, so as to make a T-shaped mark. The original description does not correctly describe the apex of the wing; it is infuscated to the tip of the fourth vein. Van der Wulp had numerous specimens from Guerrero, a State of Southern Mexico.

Helomyza punctulata Van der Wulp.

"Testaceous; head and legs rufous; front and face with black dots; wings blackish at the costa and tip.

"Length 5 mm.

"Front broader than the eyes, orange-rufous; face, cheeks and occiput pale rufous; ocellar knob black; two black dots near the vertex next the eyes and two smaller ones between the eyes and the root of the antennæ; three similar points on the face—one in the middle and two on the sides of the oral margin, these latter bearing the vibrissæ; face with a narrow silver-white lateral margin; on the occiput is a central black spot, on each side with a white border. Antennæ rufous; third joint ovate; arista black, distinctly plumose. Proboscis pale rufous; palpi black, at least at the tip. Thorax and scutellum reddish testaceous; thoracic dorsum with more or less distinct brown stripes; a blackish band from the shoulders to below the base of the wings; pleuræ and metanotum pale rufous; thorax laterally with several bristles; scutellum with four bristles. Abdomen rufous, the segments with blackish hind borders and marginal bristles. Legs pale rufous, the tarsi towards the end and the tip of the hind femora blackish; femora and tibiæ with weak bristles. Halteres rufous. Wings with short spines along the costa; from the end of the first vein the costa has a blackish border, which becomes broader outwards and extends round the tip of the wing; the cross-veins are covered by blackish spots; venation as in the preceding species [*iniens*].

"Habitat. Mexico, Omilteme in Guerrero, 8000 ft. (H. H. Smith)."

Helomyza distigma Van der Wulp.

"Rufo-testaceous; antennæ and legs rufous; two rounded spots in the first posterior cell, in addition to the other blackish markings on the wings.

"Length 5–7 mm.

"*Male.*—Head pale rufous; front much broader than the eyes; ocellar point shining brown, emitting two bristles, which are curved forward; exterior to these are two other bristles, and on each side of the vertex a pair of post-vertical bristles; face and cheeks broad; two weak vibrissæ at the oral margin. Antennæ rufous, short; third joint rounded; arista black, nearly bare. Proboscis and palpi rufous. Thorax and scutellum testaceous; thoracic dorsum with numerous hair-points; pleuræ with a brown stripe from the shoulders to beneath the base of the wings; the sides of the thorax with some bristles; scutellum with four bristles—one on each side and two at the hind margin; metanotum rufous. Abdomen grayish-brown, the anal segment globular and more rufous; the segments with some marginal and lateral bristles. Legs rufous, tips of the tibiæ, and the last three joints of the tarsi blackish; hind tibiæ with an indistinct brown ring near the base; femora rather robust, hairy beneath, the first and third pairs each with a row of bristles on the upper side; tibiæ with a preapical bristle. Halteres pale rufous. Wings grayish, with a row of short costal bristles, and with a blackish costal border, covering the mediastinal cell and from there extending to the tip of the wing, where it becomes narrower, to the end of the fourth vein; the cross-veins bordered with black; a spot on the fourth vein beyond the posterior cross-vein, a rounded dot between the second and third veins, just above the small cross-vein, and two similar spots between the third and fourth veins. Small cross-vein a little beyond the end of the first vein and beyond the middle of the discal cell; posterior cross-vein straight and slightly oblique.

"*Female.*—Differs from the male in having the abdomen pointed towards the apex, the arista shortly plumose, and the legs more slender and less hairy; the femora have a brown spot on the upper side near the tip, and the tibiæ dark rings near the base; the markings of the wings are similar, only the blackish dot between the second and third veins is wanting.

"Hab. Mexico, Amula, 6000 ft.; Xucumanatlan, 7000 ft.; and Sierra de las Aguas Escondidas, 9500 ft., all in Guerrero (H. H. Smith)."

Helomyza polystigma Van der Wulp.

"Testaceous; a blackish stripe on the pleuræ; wings with a blackish border to the costa and to the cross-veins, and numerous spots in all the cells. Length 4.5 mm.

"Allied to the preceding species [*distigma*], but smaller and differing from it in the markings of the wings. Face, cheeks, and anterior portion of the front yellowish, with a white reflection; front posteriorly rufous, with some brown points; frontal bristles as in *H. distigma;* a black spot on each side between the orbits and the root of the antennæ. Antennæ rufous; third joint rounded, blackish on the upper side; arista with very short hairs. Proboscis rufous (the palpi inconspicuous in the specimens examined). Thorax and scutellum brownish testaceous, the shoulders yellowish, beneath them on the partly cinereous pleuræ a blackish stripe; scutellum with four bristles. Abdomen brown, the segments with narrow black borders. Femora blackish; tibiæ rufous, with black

tips; first joint of the tarsi rufous, the following joints blackish; tibiæ with a preapical bristle. Halteres yellow. Wings grayish; a black border along the costa, around the tip and on the cross-veins, and blackish spots of different sizes in all the cells; the costa with a row of short bristles; small cross-vein nearly under the end of the first vein, and on the middle of the discal cell.

"Hab. Mexico, Sierra de las Aguas Escondidas in Guerrero, 9500 ft. (H. H. Smith).

"Two female specimens."

ALLOPHYLA Loew.

One fronto-orbital bristle; five dorso-central, arranged as in *Helomyza;* one humeral; one propleural; one presutural; two notopleural; no prescutellar; two pairs scutellar; three supra alar; one sternopleural; no mesopleural.

Head as in *Helomyza*, third antennal joint a little elongated, arista pubescent.

The main distinction between this genus and *Helomyza* is in the absence of the humeral bristle in the latter.

Only one North American species has been brought to light.

Allophyla lævis Loew.

Length 4.7 mm.; of wing 5 mm.

Yellow, antennæ of the same color or a little darker, third joint infuscated in the female; arista pilose.

Head yellow; front saffron-yellow, with very delicate pubescence, eyes rather large (about twice the width of the cheeks), round; cheeks straw-yellow; vibrissæ very delicate.

Thorax varying from saffron to straw-yellow, densely pubescent; scutellum bare except the ordinary four bristles; mesopleura bare; sternopleura rather sparsely pubescent, with one strong bristle.

Abdomen yellow, more or less infuscated, hypopygium of the male small.

Wings almost hyaline, unspotted, except a little infuscation around the hind cross-vein.

Legs straw-yellow, last tarsal joint black.

Two males and six females. Johnson: Montpelier, Vermont, June 25th; St. Johnsbury, Vermont, June 27th; Mt. Greylock, Massachusetts, June 15th; Castle Rock, Pennsylvania, June 16th. U. S. N. M.: White Mountains, New Hampshire, Morrison. Aldrich: Guemes Island, Washington, July 13th; Mt. Constitution, Orcas Island, Washington, July 7th.

SILIGO Aldrich, n. gen.

(Latin, *siligo* a very pale kind of wheat; feminine, accent on second sylable.)

One humeral bristle; one propleural; two notopleural; five dorso-

central; one presutural; three supra-alar; two scutellar (pairs); one mesosternal; two fronto orbital; two sternopleural; no prescutellar.

Head rounded, eyes round; antennæ short, third joint slightly elongated, with short, bare arista; face moderately receding, epistoma ascending between the small vibrissæ, with a distinct edge. Thorax with sparse and coarse hairs, besides the bristles. Wings with first vein short, and the auxiliary pale and thin, difficult to perceive, yet ending separate from the first vein.

Type.—*Oregona.*

On account of the comparative shortness and indistinctness of the auxiliary vein, it may be thought that *Siligo* is not a true Helomyzid genus; after comparing it with numerous genera in Sapromyzidæ, Geomyzidæ, etc., we are satisfied that its nearest relationships are here. It is very unlike *Curtonotum.*

While the course of the suture over the middle of the dorsum is not very apparent, either in this or *Helomyza*, the indications are that in *Helomyza* there is only one bristle before the suture, while here there are two, and only three behind.

TABLE OF SPECIES.

Bristles all yellow.....**oregona** n. sp.
Bristles all black.....**litorea** n. sp.

Siligo oregona Aldrich, n. sp., Pl. IV, figs. 1, 7.

Length 2.8 mm.; of wing, the same.

Yellow. All the hairs and bristles yellow, except the spines of the costa, which are black.

Head entirely yellow; eyes of medium size, round; antennæ yellow; arista of medium size, only microscopically pubescent; ocellar bristles very long; cheeks somewhat inflated, about the width of the eye.

Thorax entirely straw yellow, dorsum sparsely pubescent; scutelium entirely yellow, bare except the ordinary four bristles; mesopleura bare except one large and two small yellow bristles at the upper posterior corner; propleura bare except the one propleural bristle; sternopleura besides the two long bristles on the upper edge with rather sparse pubescence.

Abdomen grayish-yellow, hypopygium of the male small and inconspicuous, but armed with a slender black filament turning back.

Wings hyaline, veins yellow; spines of the costa black, rather long and prominent.

Legs entirely straw-yellow; a row of rather strong bristles on the under side of the fore femur; tarsal claws black except at base.

Three males, two females. Aldrich: Hood River, Oregon, July.

The head in *oregona* is more produced downward than in *litorea*, but the difference is almost wholly in the cheeks; in *oregona* the epistoma extends upward between the vibrissæ farther than in *litorea.*

Siligo litorea Aldrich, n. sp.

Length 1.9 mm.; of wing, about the same.

Ground color of body black, bristles all black.

Head yellow, the occiput, vertex and middle of face black; epistoma bordered with a narrow black line, which expands upward between the vibrissal ridges; vibrissæ of moderate size; antennæ yellow, the third joint considerably infuscated and slightly elongate; arista short, black, a little thickened at base; front yellow, the sides narrowly cinereous and the vertex black in color, which does not extend forward in a sharp angle as usual; two large fronto-orbital bristles—but the posterior one missing on one side in the described specimen, seemingly an abnormality. Eyes roundish, slightly angulated above, the cheeks over one-third as high as the eyes. Palpi rather brownish-yellow.

Thorax cinereous, with black ground color, the pleuræ, scutellum and metanotum concolorous; bristles large and hairs very few; between the rows of dorso-centrals are about ten hairs arranged in two rows, very distinct; scutellum with two pairs of bristles, otherwise bare; mesopleura with one bristle and several hairs at the posterior edge, just below the base of the wing; pteropleura bare; sternopleura with two bristles and a few hairs; halteres light yellow.

Abdomen cinereous, concolorous with thorax; hypopygium small, with some indistinct grasping organs turned forward underneath.

Coxæ and femora blackish, tibiæ and tarsi yellow, the latter but little infuscated towards the tip; pulvilli moderately large.

Wings almost hyaline, the veins yellowish, cross-veins not infuscated; third vein ending precisely in the apex; bristles of the costa small and few.

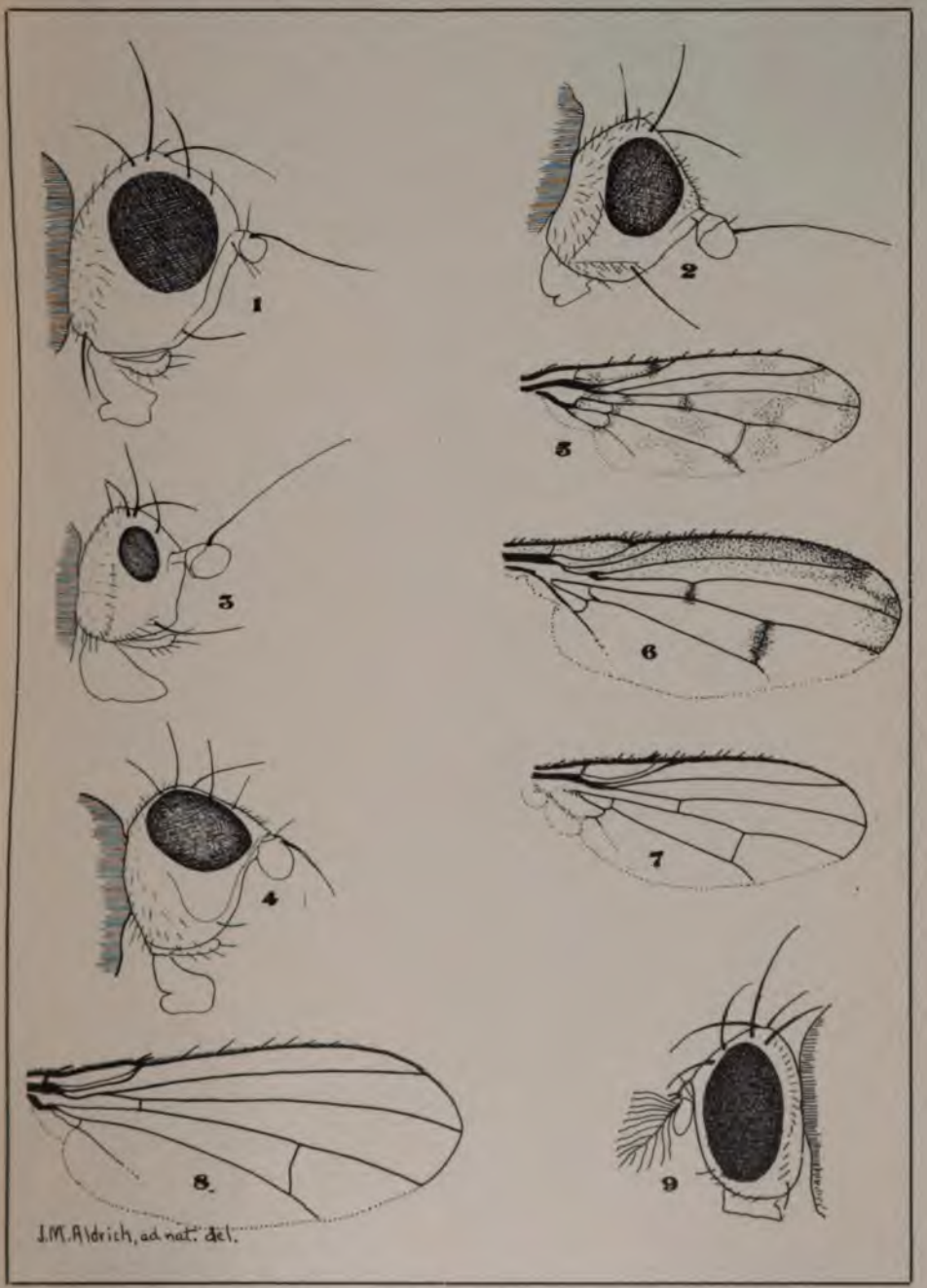
One male. Aldrich: Pacific Grove, California, May 8, 1906, collected at the seashore a little above high tide line, where a small seepage of fresh water made a streak of verdure.

Explanation of Plate IV.

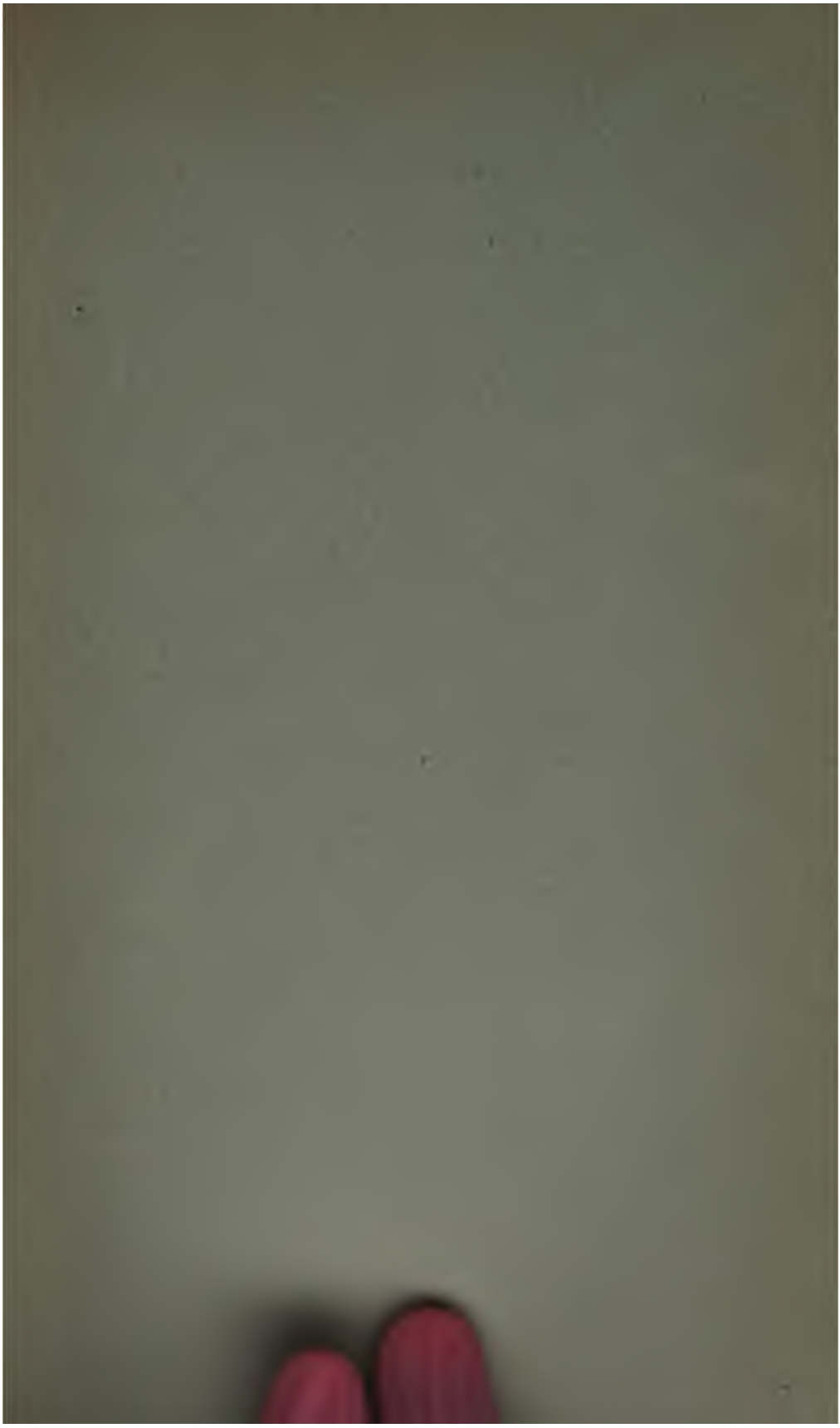
The parts are variously magnified: No. 1 is one of the smallest of the family; No. 3 above the average. The veins of the wings are not generally very black in life, making the actual appearance quite different from the drawing; this is especially true of No. 7.

Fig. 1.—*Siligo oregona*, new genus and species.
" 2.—*Porsenus johnsoni*, new genus and species.
" 3.—*Eccoptomera americana*, new species.
" 4.—*Anorostoma maculata*, new species.
" 5.—*Anorostoma maculata*, new species.
" 6.—*Helomyza limbata*, Thomson.
" 7.—*Siligo oregona*, new genus and species.
" 8.—*Cyrtonotum helvum*, Loew.
" 9.—*Cyrtonotum helvum*, Loew.

Figs. 8 and 9 are added for comparison, but the species does not belong to this family. The second basal cell is confluent with the discal, as figured, in many cases, but is sometimes distinct; the second and third basals are very small. The anterior fronto-orbital curves strongly forward.



ALDRICH AND DARLINGTON ON DIPTERA.



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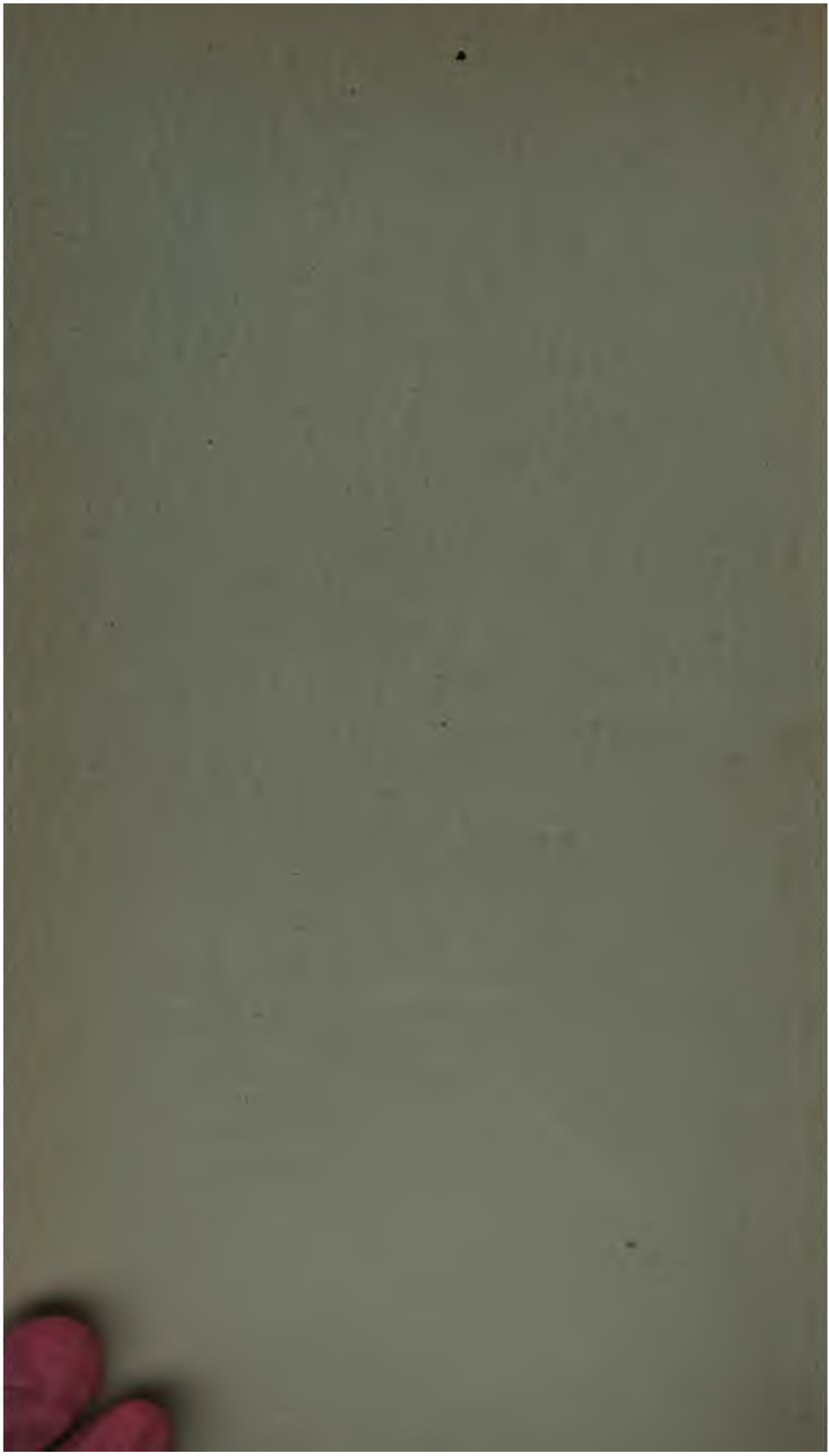


THE EVANIIDÆ, ENSIGN-FLIES, AN ARCHIAC FAMILY OF HYMENOPTERA.

(Plates V-XV.)

BY J. CHESTER BRADLEY.

When in the fall of 1901 I published in the TRANSACTIONS of the American Entomological Society a paper on the Aulacinæ of North America,* I intended it as the first one of a series of three papers, which I expected shortly to complete, one on each subfamily of the Evaniidæ. Through many intervening circumstances this design has been frustrated, but out of it has grown the present paper.

This contribution deals primarily with the Evaniinæ, and contains as complete a monograph of the North American species of that subfamily as I have been able to prepare. But I have found a study of exotic genera and species necessary to a satisfactory concept of the classification and relations of the group. Indeed, the variations of form shown by the members of this group and their comparison with each other and with other groups, native and exotic, has been to me the most interesting part of the work, and I trust that I may be pardoned if I have laid more stress on it than is customary in purely systematic works, where often little attention is paid to characters not found desirable for use in keys.

As a second part of this paper I have embodied the result of my study of exotic forms. Here are included descriptions and remarks on the genera and species of the world, a table to the genera, and finally a table to all the described species whose generic position I could with reasonable certainty identify. The latter have been compiled almost entirely from literature, which is I believe the only practicable method, because no one person can expect to accumulate even a large proportion of the species of the world. These certainly must prove unsatisfactory, and must contain many errors, for the descriptions are often very incomplete, and it is difficult to compare those drawn up by different authors. But I hope that

* Trans. Amer. Ent. Soc., xxvii, p. 319.

they will be of some real service to students desirous of identifying exotic species, and who at present must perforce wade through a great mass of more or less unsatisfactory descriptions in several languages and innumerable publications. In preparing them I have used my best judgment in selecting characters that would be reliable and easy to use, but have of course been greatly hampered in this respect by the limitations of the descriptions. In such cases as I have been able to examine the species in question, matters have of course been much expedited.

I shall begin the paper with a short consideration of the family as a whole; then of the Aulacinæ, tabulating the genera of the world and in part supplementing, in part revising, my former paper on the North American species. Then I shall take up the Fœninæ, treating it briefly. I regret that at present I see no prospect of being able to prepare a more complete monograph of our North American species of this subfamily. In perhaps no group that I have studied have the characters been so variable and difficult of tabulation, so that it would require a very considerable amount of time and study. Then will follow the parts on the Evaniinæ as above described, and I shall conclude with a catalogue of the species of Evaniinæ of the entire world, distributed according to their proper genera.

I wish to express my obligations to Professor Comstock of Cornell University, who has placed at my disposal in the entomological laboratory of that institution, where most of this work has been carried on, every facility for study that could be desired, and has kindly read the manuscript: to Dr. A. D. MacGillivray, also of Cornell University, for constant assistance, suggestions and courtesies of many kinds, and also for reading the manuscript: to the authorities of the United States National Museum for the loan of the very valuable collection of Evaniidæ belonging to that Museum: to the American Entomological Society for the loan of many specimens; to Mr. C. T. Brues and Dr. P. P. Calvert for the presentation of several specimens: to Mr. Henry L. Viereck for the presentation of numerous valuable specimens, particularly of North American *Hyptia*, and some undescribed species from British Guiana: to Mr. G. V. Hudson of Wellington, New Zealand for the presentation of two species of Fœninæ including the type of the genus *Pseudofœnus*: to Professor Herbert Osborn, Professor E. D.

Sanderson, Mr. Wm. Beutenmüller, Professor Carl F. Baker, Dr. A. D. Hopkins, Mr. Erich Daecke and others for the loan of numerous specimens: to Mr. C. S. Spooner and Mr. H. J. Hammond for assistance with the manuscript.

The figures of wings on Plates XI–XV inclusive were made as follows: the wings were removed from the right hand side of the insect, mounted on slides and then photographed. Blue-prints were made on drawing paper coated with blue-print solution. The outlines of the veins were then drawn on the print with water-proof India ink, and after thorough drying the print was bleached in a strong solution of potassium oxalate, leaving the ink drawing on a white background. Thus almost mechanical accuracy was obtained in the representation of the thickness and position of the veins. Figs. 67, 82 and 87 were copied by a similar method from published figures, inasmuch as no specimens of these genera were available. Figures 18, 19, 62, 63 and 64 were drawn free hand. The remaining drawings were made with a camera lucida. The drawings on Plates VII and VIII were all made to the same scale, as were those on Plate IX. The claws on Plate IX were mounted on slides, hence present a somewhat different appearance from what would be seen *in situ*. Plate V is from direct photomicrographs.

I have been able to study specimens of all the described genera except the following: *Evaniscus* Szepligeti, *Evaniellus* Enderlein, *Aulacinus* Westwood, *Semenowia* Kieffer and *Aulacus* Jurine; also of all the North American species of Aulacinæ and Evaniinæ except *Hyptia brevicalcar* Kieffer, *Aulacus erythrogaster* Kieffer, *Pristaulacus flavipes* Kieffer.

The Evaniidæ are an anomalous family of parasitic Hymenoptera, probably of very ancient stock, and as is often true in such cases, although well represented in number of species, the individuals are almost invariably to be counted as rare insects, and are not usually well represented in collections. Because of their anomaly they have formed, as I have before remarked, a dumping ground for very many peculiar forms whose relationships have puzzled investigators. In this way the following genera and perhaps others have at one time or another been included in the family, in addition to those we at present include: *Pelecinus*, *Stephanus*, *Megischus*, *Paxilloma*, *Trigonalys*, *Monomachus*, *Ophionellus*, *Megalyra*, *Capitonius*, *Cænocœlius*, *Leptofænus*, etc. To-day most authors are

agreed in restricting the family to the scope recognized in this paper, except that some include with it the Stephanidæ. While I think the latter are sufficiently distinct to form a family by themselves, I believe they really are closely related to the Evaniidæ, particularly through the Fœninæ. There is a similarity in wing venation, and the insertion of the abdomen in *Stephanus* is on the lower part of the propodeum, but above the coxæ. Even the habitus is somewhat similar. It is not improbable that the Fœninæ may really be more closely related to Stephanidæ than to Evaniinæ or Aulacinæ, and should really form a subfamily of the former rather than of the Evaniidæ. Although really I think all of the subfamilies here recognized are entitled to family rank.

There are two characters that are usually employed in distinguishing the Evaniidæ. These are the presence of the cell C in the front wings (Fig. 69), and the insertion of the abdomen on the propodeum far above the posterior coxæ. Neither are absolute, and may be used only in conjuction with other characters. The Stephanidæ, as before mentioned, have a distinct costal cell, while several genera of Braconidæ have the abdomen inserted on the propodeum far above the coxæ; some of the Stephanidæ less distinctly so. The Roproniidæ have a distinct costal cell, but the abdomen inserted normally.

In designating the wing veins I have employed the system proposed by Comstock and Needham.* I do this because I believe that the venation thereby takes on an intelligible significance. The veins are, I am convinced in the main, correctly homologized with those of other orders. I intend to employ this system as far as possible in my future studies of the Hymenoptera. I refer the reader who is not familiar with it to the paper of Comstock and Needham just cited, and for its application to the Hymenoptera, particularly to a paper by Dr. A. D. MacGillivray† on the wing venation of the Tenthredinoidea, where the subject is treated very clearly in Sections II and III, pp. 574 to 583. An appreciative and careful study of these sections and their accompanying figures will I am sure make the matter clear to any one.

* "Wings of Insects," J. H. Comstock and J. G. Needham, Amer. Nat., vol. xxxii and xxxiii, 1898 and 1899.

† "A Study of the Wings of the Tenthredinoidea, a Superfamily of Hymentera," by A. D. MacGillivray, Proc. U. S. Nat. Mus., vol. xxix, pp. 569-654, 1906.

For convenience I give below the terms used by Cresson in his Synopsis of the North American Hymenoptera and their corresponding designation in this paper (Figs. 67 and 69).

VEINS.

Costa = C.
Subcosta = Sc + R + M.
Marginal or radial vein = r, Rs, R_{3+4} and R_3.
1st transverse cubitus = r-m and R_s.
2d transverse cubitus = R_5.
3d transverse cubitus = R_4.
Basal vein = M and m-cu.
Cubitus = M, M_{1+2}, $R_5 + M_1$ and $R_{4+5} + M_1$.
1st recurrent vein = M_{3+4}.
2d recurrent vein = M_2.
Discoidal vein = M_3 and M_4.
Subdiscoidal vein = m and M_2.
Externo-medial vein = Cu and Cu_2.
Transverso-medial vein = $M_4 + Cu_1$.
Anal vein = 1st + 2d + 3dA, Cu_2 + 1st + 2d + 3dA, $M_4 + Cu_{1+2}$ + 1st + 2d + 3dA, and $M_{3+4} + Cu_{1+2}$ + 1st + 2d + 3dA.

CELLS.

Costal = C.
Stigma = Sc_2.
Marginal or radial = $2dR_1 + R_2$.
1st submarginal or cubital = R + 1stR_1.
2d " " " = R_5.
3d " " " = R_4.
4th " " " = R_3.
Median or externo-medial = M.
1st discoidal = M_4.
2d " = M_3.
3d " = 1st M_2.
1st apical = $2dM_2$.
2d " = M_1.
Submedian or externo-medial = Cu + Cu_1.
Anal = 3dA.

The combination of veins and consequent nomenclature will generally be different for each abscissa. In Fig. 73 it will be seen that the medial cross-vein and the second branch of media form apparently a single vein with no indication where they join. In such cases where two different abscissas are joined end to end without indication of the place of union, I have designated the entire vein thus formed by the name of each abscissa connected by "and", or if three or more are thus joined, use a comma between the first two and "and" between the second, as m and M_2, or, again, R_2, R_{3+4} and R_3. The + mark of course is only used where two or more veins unite side by side, as $R_{4+5} + M_{1+2}$.

On Plates XI–XV inclusive are arranged figures of all the types of wings known to occur in the family, in what I believe to be an order ascending from the most generalized to the most modified, especially within each subfamily. The Aulacinæ are very evidently the most generalized. Take for example *Aulacinus* (Fig. 67), R_4, R_5 and all of M_2 are present. Omitting for the present the Fœninæ (Figs. 72–74), we find in the wing of *Evania* (Fig. 76) only a slight modification. R_5 is lost and also the transverse part of M_2. M has migrated far forwards along the radius, carrying with it m-cu. In this subfamily modification then proceeds by atrophy, until in *Evaniellus* (Fig. 87) only C and Sc are left. The Fœninæ (Figs. 72–74) we may look upon as a side line. We cannot compare the degree of their specialization with the others, because it has been in an entirely different direction. It seems reasonable to suppose that they may have arisen as an offshoot of Aulacinæ (compare Figs. 71 and 72), or they may have arisen from somewhere among the ancestors of the Stephanidæ. At any rate in wing venation and other characteristics they are highly modified. Of course I do not base my conclusions as to the relations of these groups solely on the wings, but these are easy of illustration and description, and in all more reliable for comparison than any other single character, hence I emphasize them here.

L'Abbe Kieffer* criticizes the table to the subfamilies of Evaniidæ that I published in my former paper, on the grounds that the characters given do not apply in all cases. But I think that his criticism is unfair, since the table was intended only for the North American forms, for which so far as I am aware it holds good. All

* Spec. Hym. d' Eur. et d' Alger., vii, bis, p. 377.

the exceptions urged are for exotic species. His own table published in the same place is open to the same objections. Thus under his tribe Evaniinæ he says: "Nervure basale aboutissant au stigma, rarement évanouie dans sa partie supérieure." In the genera *Hyptia*, *Semœomyia*, *Semœodogaster*, *Evaniellus* and sometimes *Zeuxevania*, the "nervure basale" is wanting. Again he says: "Abdomen . . . . . ellipsoïdal chez le mâle." In *Hyptia* and others the abdomen in the male is round and indistinguishable from that of the female in shape. I think that the characters employed in the following table will be found constant, except that I am not certain whether the folding of the wings is constant in all Fœninæ or not. It is in all cases that have come under my observation.

TABLE OF THE SUBFAMILIES OF EVANIIDÆ.

1. Front wings with the transverse part of M_2 present (Fig. 67); not folded longitudinally; hind wings without a posterior lobe (Fig. 69); metasternum not prolonged into a furcula; abdomen clavate, the basal segment not filiform-petiolate, nor strongly contrasted to the second in form ..... AULACINÆ.

   Front wings with the transverse part of M_2 absent (Figs. 72 and 76).....(2).

2. Hind wings without a posterior lobe (Fig. 72); front wings folded longitudinally as in Vespoidea; metasternum not prolonged into a furcula; abdomen clavate and compressed, the basal segment not filiform-petiolate, nor strongly contrasted to the second in form.....FŒNINÆ.

   Hind wings with an almost separated posterior lobe (Fig. 76); front wings not folded longitudinally; metasternum prolonged into a furcula between the posterior coxæ; abdomen with the basal segment filiform-petiolate, strongly contrasted to the following segments in form, the latter together compressed, oval (♂), triangular (♀), or nearly round in both sexes.....EVANIINÆ.

FŒNINÆ.

Following Schletterer, authors have of recent years used *Gasteruption* as the name of the typical genus of this family. But *Gasteruption* of Latreille (1797) is a nomen nudum—no species being mentioned. In 1798 Fabricius describes *Fœnus* with *jaculator* and *assectator* as species. Latreille in 1802, Hist. nat. Crust. and Insec., iii, 329, says: "J'avois établi ce genre avant Fabricius, sous le nom de *Gasteruption;* mais, comme ce dernier mot est trop dur, j' adopte avec plaisir la dénomination de ce naturaliste."

As before remarked, the Fœninæ show unmistakable relations to the Stephanidæ.

The wing of *Hyptiogaster* is the most generalized in the sub-

family. In *Fœnus* (Fig. 73) the base of the longitudinal part of M has become interstitial with Cu_1, crowding m-cu out of existence and greatly reducing the size of the cells M_3 and M_4. In *Pseudofœnus* (Fig. 74) the condition is the same, except for an additional step, the vein M_4 being lost and cells M_3 and M_4 thus thrown together.

The habitus is similar in all the species that I have studied, the proportions being always slender, the neck long, and the posterior tibiæ very strongly clavate. But not in the genus *Hyptiogaster*, at least not in *H. humeralis*, in which the form is stouter, the neck short and the posterior legs stout; the femora very stout, as though for leaping; the tibiæ stout but not clavate; the tarsi very short, exclusive of the claw, less than one-third as long as the tibiæ, the second and third joints being extremely short, much broader than long, while the claw is quite large. The mouth parts are much enlarged and used for sucking (Figs. 20–21).

The claw (Fig. 43) is always simple; the mouth parts are shown in Figs. 20–23.

An interesting character is found in the longitudinal folding of the wings, as in the Vespoidea. Outside of these there is only one other genus of Hymenoptera known to have this habit, namely *Leucospis*, a Chalcid.

A quite extensive account of the life history of *Fœnus* (*Gasteruption*) is given by Hoppner.* The genus is parasitic on the larvæ of aculeate Hymenoptera, and has been bred from *Prosopis*, *Trypoxylon*, *Osmia*, *Eriades*, *Odynerus*, *Colletes* and *Cemones*. In the collection of Cornell University is a specimen lacking an abdomen, but probably *F. incertus*, bred from the nest of *Passaloecus distinctus* Fox.

Only *Fœnus* occurs in the United States.

TABLE TO THE GENERA OF FŒNINÆ.

1. In the front wings m-cu absent (Figs. 73, 74), the base of the longitudinal part of M joining Cu_1; [Posterior tibiæ swollen and clavate; habitus slender, the neck and head usually long] † .....(2).

   In the front wings m-cu present, the base of the longitudinal part of M being removed from Cu_1 (Fig. 72); [Posterior femora and tibiæ sometimes much swollen but not clavate; the tarsi sometimes very short; joints 2–4 broader than long; habitus stouter, head and neck not elongate.]* **Hyptiogaster** Kieffer.
   (Type *Gasteruption antennale* Schletterer).

* Allg. Zeitschr. f. Entom., ix, p. 97, 1904.

† The bracketed characters may not always hold true, but do in all the species that I have seen.

2. The free part of M_4 present (Fig. 73).. **Fœnus** Fabricius (*Gasteruption* auct).
(Type *Ichneumon assectator* L.)

The free part of M_4 lost (Fig. 74)..... **Pseudofœnus** Kieffer.
(Type *Gasteruption pedunculatum* Schletterer.)

Fœnus maculicornis Cameron, from Mexico, belongs to the genus *Pseudofœnus*.

TABLE TO THE NORTH AMERICAN SPECIES GROUPS OF FŒNUS, AND THE SPECIES OF THE MONTANUS GROUP.

1. Ovipositor of the females as long as the abdomen ..... **tarsatorius** group.
Ovipositor of the females about one-quarter as long as the abdomen.
montanus group (2).
2. Medial mesothoracic lobe shagreened, not striate ..... (3).
Medial mesothoracic lobe transversely rugose-striate..... **micrura** Kieffer.
3. Second, third and fourth abdominal segments banded black and red.
montanus incertus Cresson.
Apex of second, third, fourth and fifth abdominal segments except dorsal spots, entirely red, middle and posterior legs often red beneath.
montanus Cresson.

Fœnus montanus Cresson.

1864. *Fœnus montanus* Cresson, Proc. Ent. Soc. Phila. iii, p. 132.
1864. *Fœnus incertus* Cresson, ibid., p. 133 (= race *incertus*).
1903. *Gasteruption micrura nigripectus* Kieffer, Ark. Zool., i, p. 556.
1904. *Gasteruption nevadense* Kieffer, Invert. pacifica, i, p. 41 (race *montanus*).

Black, abdomen often partly rufous, legs sometimes light, ovipositor 2.5-3 mm. Length 7.5-13 mm.

♀.—Head black; occiput and face very minutely roughened, with close punctures several times smaller than the facets of the eye, giving the whole a dull opaque lustre; jaws black, punctures larger and not so close; no area on the face separated by grooves; face impubescent, except for a fringe of yellow hairs on the edge of the clypeus, which is emarginate, its articulation marked by a very fine suture; a short ridge between the antennæ above; face not narrowed; head very broadly rounded behind the eyes, posterior margin simple; first joint of flagellum strongly clavate, two-thirds the size of second, which is subcylindrical, third scarcely longer than the second, but perfectly cylindrical; antennæ more minutely punctured than the face, glabrous to the middle of the third segment of the flagellum, where it becomes pubescent; head beneath glabrous. Neck short, finely wrinkled anteriorly below, smooth posteriorly, with a few scattered punctations; above more coarsely reticulate. Thorax black; margin of prothorax wavy, without any well-marked tooth; propleura and mesothoracic lobe finely roughened with punctures somewhat larger than the facets of the eye, especially the former; parapsides smooth and more sparingly punctulate, without an impressed longitudinal line; meso- and metapleuræ more coarsely punctulate; scutellum very finely punctulate; wings hyaline, without violaceous reflection, veins dark. Legs nearly black, somewhat subcastaneous, evenly and most minutely punctulate, tibiæ and tarsi covered with short pubescence. Abdo-

men black, second and third segments tipped with rufous; a rufous spot on each side of the third segment and ventrally; abdomen much compressed, smooth and with a dull, not silky lustre.

♂.—Similar to female, but slightly more pubescent and punctations generally a little larger.

The description applies to the race *incertus*.

The races *montanus* and *incertus* merge one into the other. *Montanus* has much more red on the abdomen, violaceous wings, and very frequently the under side of the middle and posterior legs red. It seems to be more common in Nevada, and to extend eastward into Colorado (West Cliff), and northward into Oregon (Mt. Hood) and Washington. *Incertus* is the common form in Colorado (type locality) and is also recorded from New Mexico (Beulah, August 17th, Dr. Skinner; July 11th, T. D. A. Cockerell), from Oregon (Mt. Hood), and from Washington. Further east it occurs in Canada; New Hampshire; Massachusetts; Pennsylvania (Castle Rock, Dr. Skinner), and Virginia.

The eastern specimens seem to differ slightly from the western; they usually have a white base to their posterior tibiæ, while in western individuals the tibiæ are usually entirely black.

Fœnus micrura Kieffer.

1903. *Gasteruption micrura* Kieffer, Ark. f. Zool. i, p. 556.

♀.—10 mm. Black. Head opaque, very finely shagreened; eyes short, hairy; occiput nearly semicircular, slightly less than half the length of the eye; posterior margin simple, weakly concaved; posterior ocelli somewhat more widely separated from each other than from the compound eyes; cheeks very short, shorter than the second antennal segment; antennæ dark brown, paler at the apex; the second segment longer than thick, two-thirds as long as the third; the fourth a little longer than the third.

Thorax dark red; neck and upper side of the thorax almost black; neck short; pronotum with an indistinct tooth on the anterior angles; medial mesothoracic lobe thickly, rather finely transversely rugose-striate, the lateral and posterior parts of the mesonotum leather-like, as also the scutellum, and the propleuræ and mesopleura; propodeum reticulate. Wings hyaline; posterior wings with three costal hooks, without cells; coxæ and legs brownish yellow; posterior legs darker, the base of their tibiæ white; posterior coxæ transverse-striate; metatarsus as long as the four following segments united. Apical third of the second, third and fourth abdominal segments yellowish-red; ovipositor scarcely longer than the petiole; vaginæ entirely black, their apex weakly spindle-shaped.

Male similar to the female.

The description is translated from Kieffer.

The color of the thorax is usually entirely black.

Type locality, Illinois. I have seen specimens from New Hampshire (New Glenn House, White Mtns.); Massachusetts and Virginia.

Fœnus tarsatorius Say.

(?) 1851. *Fœnus barnstoni* Westwood, ♀, Trans. Ent. Soc. London, n. s., i, p. 220.
1859. *Fœnus tarsatorius* Say, ♀, Entom. North Amer. i, p. 215.
1889. *Gasteruption tarsatorium* Schlett, Ann. d. k. k. Nath. Hofm. Wien, iv, p. 482.
1903. *Gasteruption intricatum* Kieffer, Ark. f. Zool., i, p. 556.

Black or brown; punctures on dorsum deep, large and scattered among the coarse wrinkles. Length 10–14 mm. Ovipositor 10.5–13 mm.

♀.—Head black, very minutely punctulate, somewhat shiny on top, slightly silvery-sericeous between the eyes and antennæ, mandibles testaceous, tipped with rufous; margin of clypeus sinuate, emarginate in centre; head behind eyes narrowed, margin not reflexed; antennæ pubescent toward apex, from about the third segment of flagellum; this short clavate. Thorax black, laterally silvery-sericeous; dorsum coarsely reticulate or transverse-wrinkled, with large punctures between and small ones on the wrinkles or meshes; propodeum coarsely reticulate. Wings hyaline, irridescent, without violaceous reflection; veins pale. Four anterior legs entirely testaceous, including coxæ; posterior coxæ black, finely transverse-wrinkled; femora reddish-brown; tibiæ white at base, especially anteriorly, club brown; tarsi white, apex brown. Abdomen silky, black, two or three segments tipped with a ferruginous lateral spot. Borer red, sheaths black, tipped with white.

If this proves to be identical with *barnstoni* of Westwood, that name will replace *tarsatorius* Say.

Hab.—Massachusetts (Medford, G. Dimmock); North Carolina; Virginia; Canada; New York (Ithaca); Pennsylvania.

Fœnus fragilis nov. spec.

Very frail and slender, abdomen brown to black, with ferruginous spots, legs dark brown, wrinkles on the dorsum subobsolete medially, dwindling into punctures. Length 11 mm. Ovipositor 9–13 mm.

♀.—Head black; face clothed laterally and on the border of the clypeus with silvery sericeous pubescence; face sparingly, vertex more closely covered with punctures the size of the facets of the eyes; the mandibles are rufous, the apical tooth small, blunt, and the apex, which is also somewhat blunt, is not prolonged beyond it, very slightly punctured; clypeus sinuate laterally, very broadly emarginate medially; its articulation with the face and an area beneath the antennæ well defined; occiput with a tendency toward fine transverse wrinkles, cheeks narrowed behind the eyes, posterior edge acute; first joint of the flagellum short, clavate, together with the second longer than the third by about half the length of the first. Neck long, broad at base and tapering strongly at the apex; strongly sculptured with transverse wrinkles, irregular, and rather widely separated. Prothorax similarly sculptured; on the lobe of the mesothorax the sculpture is similar but more regular toward the sides and the rear, in the middle anteriorly the wrinkles become subobsolete, dwindling into mere punctures; propodeum coarsely reticulate; sides of thorax silvery sericeous; prothorax with a well-marked acute tooth on the anterior margin. Wings hyaline, irridescent, without the beautiful violaceous reflection found in some of the other species,

veins and stigma dark. Legs entirely dark brown, except a white ring near the base of the posterior tarsi, and a subwhite ring at the base of the posterior tibiæ, broad in front and obsolete behind; posterior coxæ very finely transverse rugulose. Abdomen silky, brown at base, grading to black at apex, varied with two ferruginous spots on each side near the middle. Borer red, sheaths black, pale at apex.

♂.—Similar, except that the apex of the mandibles is a little longer, the clypeus a little more deeply emarginate, and the second joint of the flagellum short.

Five specimens with no variation, except that the ferruginous spots on the abdomen sometimes extend toward the base. The stature is very frail.

Hab.—Montana, Nevada, Oregon (Mt. Hood).

Type.—In the American Entomological Society's collection.

Fœnus pattersonæ Melander and Brues.

1902. *Gasteruption pattersonæ* Melander and Brues, Biol. Bull., iii, p. 35.
1904. *Gasteruption pyrrhosternum* Kieffer, Invert. pacific, i, p. 41.

Black, legs red, abdomen ferrugino-maculate. Thorax sub-coarsely reticulate, posterior coxæ more finely reticulate. Length 12.5 mm.

♂.—Head black; face slightly silvery pubescent; mandibles rufous, tipped darker, shining and impunctate toward the acute apex, slightly punctured at the base; clypeus sinuate, broadly emarginate, without tooth in centre; face very sparingly covered with punctures much smaller than the ocelli; punctations on the occiput larger and running into close fine transverse wrinkles; antennæ pubescent, with the second segment of the flagellum short; occiput and head beneath covered with fine yellowish pile; head behind the eyes very brief, subtruncate, margin not reflexed. Neck short, it and the entire thorax are covered with coarse and more or less regular reticulations, not confluent on the mesothorax, and about one-half the size of the ocelli. Thorax entirely black, its sides and the neck silvery sericeous, prothorax with an acute tooth on the lateral anterior angles. Wings subhyaline, without violaceous reflection and but slight irridescence; nervures and stigma dark. Four anterior legs including coxæ rufotestaceous; posterior deep rufous, tending to castaneous, the base of the tibiæ with a white ring; posterior coxæ rufous, much more finely reticulated than the thorax. Abdomen sub-silky, black, with ferruginous lateral spots on the first two or three segments.

One specimen has stood for many years in the collection of the American Entomological Society bearing a MS label in Mr. Cresson's handwriting. I have received an additional specimen (*pyrrhosternum* Kieffer) from C. F. Baker.

Fœnus floridanus n. sp.

♀, ♂.—Black, neck, prothorax, coxæ and entire legs, propodeum and spots on the abdomen red. Thorax and hind coxæ coarsely reticulate.

Length 14 mm. Borer 12.5 mm.

♀.—Head black; impubescent, except clypeus which is somewhat pubescent and roughly sculptured, rest of face closely covered with minute punctures con-

siderably smaller than the facets of the eyes, giving the surface a dull lustre; mandibles blunt, rufous; edge of clypeus somewhat sinuate; antennæ black, first joint of flagellum clavate, longer than usual; head prolonged behind the eyes, abruptly narrowed, margin reflexed. Neck long, rufous, closely transverse-striate. Prothorax, including propleura, rufous, with an acute tooth on each side of the lateral anterior angles; the entire thorax and propodeum covered with coarse reticulations, interstices about the size of the ocelli; on the mesothoracic lobe these become somewhat confluent. Wings stained dusky yellow, without violaceous reflection or very marked irridescence; nervures and stigma dark. Coxæ and entire legs rufous, except the posterior tarsi; club of tibiæ and spot on outside of posterior femora at apex black. Propodeum rufous. Abdomen silky, moderately compressed; first segment rufous, with a black medial spot near the apex; second black, with a rufous spot on each side at the apex; third black, with a smaller rufous spot; remainder black. Borer red; sheaths black, tipped with white.

♂.—Similar to the ♀, but with the propleuræ and sides of the propodeum less entirely red. Second segment of flagellum short.

A paratype from Havana, Cuba (C. F. Baker), differs from the type in having entire pleuræ, borders of median lobe of mesonotum and the propodeum red.

This species is very distinct from any other that I know by the coarse reticulation on the thorax. It most nearly approaches *pattersonæ* Melander and Brues.

Fœnus cressoni n. sp.

♀.—Head black; face very sparingly dotted with punctures much finer than the facets of the eyes, slightly pubescent; mandibles acute, rufous, tip darker, shining, punctate, especially toward the base; clypeus broadly emarginate, somewhat sinuate; occiput finely transverse-striate, not interrupted and fairly regular, antennæ black, first segment of the flagellum scarcely clavate; head rather short behind the eyes, hind margin acute. Neck of medium length, transversely wrinkled, with large interstices between the wrinkles. Thorax black; prothorax with an acute tooth on the lateral margin; medial mesothoracic lobe rather finely and closely tranverse-striate, with a few scattered punctures; sides of the thorax reticulate to rugulose, very slightly silvery sericeous: propodeum reticulate, black. Wings stained yellowish, without violaceous reflection or much irridescence; veins and stigma dark. Legs black; ring of white at base of posterior tibiæ and tarsi, on the tibiæ broadened in front; posterior coxæ very finely transverse-striolate. Abdomen dull silky black, abruptly truncate at apex, not greatly compressed; two ferruginous spots on each side near the middle subconfluent beneath.

♂.—Similar to female; segments of antennæ as in female, the second joint of flagellum twice longer than first. A little more robust than the female.

A robust species. Three specimens. The front legs sometimes reddish.

Hab.—Vancouver, Canada, Massachusetts.

Fœnus nevadæ n. sp.

♀.—Head black; face laterally silvery sericeous; finely and sparingly punctulate; mandibles subacute, rufous, tipped with black, punctate; clypeus short and broad, shallowly sinuate, broadly, not deeply emarginate; vertex almost imperceptly punctulate, running into minutely transverse striolæ; first segment of flagellum clavate; head behind the eyes narrowed, so as to be subtriangular, posterior emargination narrow, the edge prominently subreflexed; head underneath silvery sericeous. Neck short, transversely wrinkled. Thorax black; sides strongly silvery sericeous; prothorax with a tooth on the lateral angles; thorax entirely and closely covered with deep punctures, about half the size of the ocelli, but not confluent; propodeum coarsely reticulated. Wings hyaline, irridescent, without violaceous reflection; veins dark. Four anterior legs and coxæ rufous; posterior black, except a small white band on the posterior tarsi near base and on the posterior tibiæ near their base, dilated in front; posterior coxæ finely transverse-striolate. Abdomen red, except the extreme base and apex are black; scarcely compressed, tip subtruncate. Borer red, sheaths black, tipped with white.

Described from five specimens in the Cresson collection labelled in Mr. Cresson's writing "*nevadensis* n. sp." The only variation seems to be that one specimen has considerable fuscous on the abdomen. There is one specimen in the U. S. National museum collection that has the head behind the eyes a little less constricted. It is doubtfully referred to this species. The punctuation is a little more obscure, the posterior tibiæ rufous anteriorly. From New Mexico.

Hab.—Nev., N. Mex. (Mesilla Park, May 7th, T. D. A. Cockerell).

Type.—Collection of the American Entomological Society.

Fœnus perplexus Cressson.

1864. *Fœnus perplexus* Cress., ♀, Proc. Ent. Soc. Phila., iii, p. 131.

1889. *Gasteruption perplexum* Schletterer, ♀, Ann. d. k. k. Nath. Hofm. Wien, iv, p. 487.

♀.—Head black, face with a little silvery sericeous; punctation very minute and rather close; mandibles polished, rufous; clypeus sinuate, emarginate, occiput finely punctate, slightly transverse-striate; antennæ pubescent beyond the third segment of the flagellum, scape closely punctured; first segment of the flagellum short, subclavate; head narrowed behind the eyes, posterior margin prominent, subreflexed. Neck medium, closely punctate to subreticulate. Prothorax with an acute tooth on the lateral margin; thorax entirely black; mesothorax above covered with several large punctures at considerable intervals; sides of thorax more closely punctate to subreticulate; propodeum reticulate. Wings hyaline, slightly irridescent, without violaceous reflection; veins and stigma dark. Legs black; posterior coxæ finely transversely striolate. Abdomen black at base and apex, medially ferruginous. Ovipositor red, sheaths black, tipped with white. Length 10–12 mm.

♂.—Similar to female, except that the antennæ are entirely pubescent, and the second segment of the flagellum is half the length of the third; the abdomen is black, with three ferruginous spots on each side.

A distinct and interesting species. The thorax is often silvery sericeous, and the posterior tibiæ sometimes have an obscure white band at their base, broad in front.

Hab.—Colorado, Nevada.

Types.—In the collection of the American Entomological Society.

Fœnus egregrius Schletterer.

1887. *Gasteruption egregrium* Schlett., Ann. k. k. Nath. Hofm. Wien, iv, p. 486.

♀.—Head black; face very closely and minutely punctulate, with here and there a larger punctation, shining, silvery sericeous; mandibles black, tipped with rufous, punctate, polished; clypeus sinuate, rather strongly emarginate; second segment of flagellum clavate; head above minutely transverse-striolate, behind the eyes elongate, posterior margin prominent, subreflexed. Neck rather short, subfinely and irregularly rugulose. Thorax black; prothorax with an acute tooth on the lateral angles; dorsum finely and very weakly transverse-rugulose, with a few indistinct punctations scattered over it, giving the whole a finely shagreened appearance, with a dull lustre; medially behind the groove the punctures become larger and close; on the sides of the thorax they are also large and close, subreticulate; the propodeum is reticulate. Wings stained yellowish fuscous, but slightly irridescent, without violaceous reflection; veins and stigma black. Legs black, base of tibiæ white; posterior coxæ finely transverse-striolate. Abdomen with a luxurious satiny lustre, petiole black, next two segments rufo-ferruginous, remainder black. Length 16 mm.

I have seen two specimens of this species, and they seem to be sufficiently distinct from *F. occidentalis* by the shape and posterior margin of the head, the punctation of the thorax and the color of abdomen. In one specimen the only white on the tibiæ is a ring near the base of the posterior.

Hab.—British Columbia; Idaho (Priest Lake, August, C. V. Piper).

Type.—In the collection of H. de Saussure in Geneva.

Fœnus occidentalis Cresson.

1864. *Fœnus occidentalis* Cresson, ♀, Proc. Ent. Soc. Phila., iii, p. 131.

1883. *Gasteruption occidentale* Schletterer, ♀, ♂, Verh. zool.-bot. Gesell. Wien, xxv, p. 290.

♀.—Head black; face silvery sericeous, minutely, sparingly, but subregularly punctulate; mandibles black, polished, tipped with rufous, apical tooth very blunt; clypeus broadly emarginate; occiput minutely closely and regularly punctulate but not striate; scape punctured, first segment of flagellum clavate; head behind the eyes subquadrate, margin very prominently and broadly reflexed at the sides. Neck of medium length, anteriorly transversely wrinkled, posteriorly punctured. Thorax black, sides slightly silvery sericeous; prothorax with an acute tooth on the sides of the anterior margin; dorsum transverse-rugulose, with close-set large and deep punctures, the sides of the thorax more nearly reticulate; propodeum coarsely reticulate. Wings stained yellowish, not

very irridescent, but often with a strong and beautiful violaceous reflection; nervures and stigma black. Legs black; four anterior knees externally, and sometimes ring at base of posterior tarsi white; posterior coxæ transverse-wrinkled, tending to reticulate beneath. Abdomen with luxuriant satiny lustre; petiole black, following three or four segments ferruginous or rufo-ferruginous; apex black. Length 14 mm.

♂.—Similar to female; second segment of flagellum more than half the length of the third.

This largest and most beautiful of our native species shows no variation, other than as mentioned, in the series of 12 females and males before me.

Hab.—Nevada, Washington, Colorado, California (Dunsmuir, H. F. Wickham).

Types.—In collection of American Entomological Society.

Fœnus rubrofasciatus Kieffer.

1904. *Gasteruption rubrofasciatum* Kieffer, Invert. pac., i, p. 42.

♂.—Black, mandibles, apex of second and third and trace at apex of fourth and fifth abdominal segments red; anterior legs including coxæ reddish-yellow, femora in the middle and tibiæ at apex browner, middle legs brown, coxæ and trochanters black, base of tibiæ white; posterior coxæ and trochanters black, base of femora pale reddish, ring near base of tibiæ white, otherwise brown.

Head opaque, minutely transversely striated; inner margins of compound eyes slightly converging below; malar space almost obsolete; posterior ocelli nearer to the compound eyes than to each other; head narrowed behind the eyes, the posterior margin truncate, slightly concave, slightly rimmed; antennæ short, the second and third segments subequal, together shorter than the fourth; fourth longer than the fifth.

Neck short, reticulated, pronotum with a short tooth; medial mesonotal lobe transversely rugose-wrinkled, parapsides irregularly rugose, posterior part of mesonotum more coarsely transverse-wrinkled; scutellum transverse-wrinkled; mesopleuræ above shagreened, below together with the propodeum reticulate; posterior coxæ minutely transverse-striate. Petiole shorter than the second segment. Length 12 mm.

Hab.—Santa Clara County, California, C. F. Baker. A second specimen received from Mr. Baker under this name from Nevada seems to represent an undescribed species.

Fœnus septentrionalis Schlett.

1889. *Gasteruption septentrionale* Schlett., ♀, Ann. d. k. k. Nath. Hofm. Wien, iv, p. 480.

♀.—"L. 10 mm. Caput opacum, post ocellos tenuissime transverso-striolatum; capitis pars occipitalis mediocriter longa et obconica, margine postico acuto. Genæ brevissimæ. Flagelli articulus secundus quam primus evidenter sesqui longior, tertius secundo longior, quam secundus unacum primo brevior.

Collum breve. Mesonotum ante suturam crenulatam tenuiter transverso-

striolatum, punctulis dispersis valde inconspicuis, post suturam crenulatam tenuissime transverso- rugulosum sive tenuissime coriaceum. Segmentum tenuiter reticulato-rugosum, postice in medio longitudinaliter carinulatum. Coxæ posteriores opacæ sive tenuissime scabræ. Terebra abdomine brevior, abdominis petiolo longior, vaginis nigris, apice albis. Nigrum, pedibus quatuor anticis brunescentibus, tibiis, imprimis posterioribus ad basin albo-signatis.

This species I have not seen. It is closely related to *F. incertus*, but the ovipositor is about the length of the abdomen.

Hab.—British Columbia (Yale).

Type.—In k. k. Nath. Hofm. in Vienna.

Fœnus pensilis Schletterer.

1889. *Gasteruption pensile* Schlett., ♀, Ann. k. k. Nath. Hofm. Wien, iv, p. 483.

"♀. L. 10-11 mm. Caput antice levi-nitidum, supra subtilissime transverso-striolatum sive opacum, post ocellos evidenter transverso-striatum; capitis pars occipitalis mediocriter longa et obconica, margine postico simplici. Genæ vix longitudine flagelli articuli primi. Flagelli articulus secundus quam primus evidenter duplo longior, tertius articulus quam primus triplo longior.

"Collum brevissimum. Mesonotum subtenuiter et evidenter transverso-striolatum, post suturam crenulatam in medio mediocriter tenuiter transverso-rugosum et in rugis inconspicue punctatum. Segmentum medianum evidenter reticulato-rugosum. Coxæ posteriores supra subtiliter transverso-striolatæ. Terebra quam corpus totum paullulo longior, vaginis nigris, apice albis. Nigrum, pedibus fuscis, tibiis ad basin tarsisque exceptis posterioribus albatis."

Hab.—Saskatchewan River.

Type.—In the collection of H. de Saussure.

Fœnus arcus Couper.

1870. *Fœnus arca* Couper, Canad. Ent., vol. ii, p. 110.

"Head black, glossy, impunctured; eyes black, round; antennæ black, two-eighths of an inch long; thorax not so black as head; the sides beneath and between dark chestnut, interspersed with short fulvous hairs; wings fuliginous; nervures and stigma black; legs black, hairy; base of the femora fulvous; abdomen bright red, with scattered fulvous hairs; ovipositor black, as long as the antennæ. Length 3-8ths inch."

Mr. Couper mentions finding this in a cocoon under the bark of a tree.

"On the 8th of January last, while searching for hybernating Coleoptera in the woods near Ottawa, I had occasion to strip the bark of a decayed ash tree, under which, among other insect store, I found a small transparent and curiously formed cocoon containing a larva of a fly which was at that time unknown to me. The cocoon was imbedded in the bark occupying what I am now led to believe the excavation made by a grub of Cerambyx or some other coleopterous bark borer * * * *. The shape of the cocoon is oblong surrounded by a band and covered by a thin pellucid lid, and the form resembles a small coffin. The

head of the insect was placed at the small end and the space in front of it is packed with minute particles of dust, evidently produced from the bark by the original occupier. Length of cocoon ⅛ of an inch" (Couper).

Hab.—Ottawa.

Fœnus torridus n. sp.

Black and reddish-brown, the pleuræ except mesopleuræ and the sides of the abdomen toward the ends of the segments somewhat more reddish; legs from base to knees reddish-brown; anterior and middle tibiæ and tarsi, except brown spot on tibiæ within, and apex of metatarsus and remaining tarsal segments white, posterior tibiæ with ring near base prolonged within, apical three-fourths of metatarsus and following two segments white; head, especially sides of face, and thorax silvery tomentose; wings hyaline; habitus very slender, with a long neck.

♀.—Posterior ocelli on a line with the back of the compound eyes; occiput not prolonged behind the eyes, much tapered, the margin scarcely reflexed; face much narrowed below the antennæ, impressed lines beneath the antennæ diverging below, forming a somewhat elongate triangle, the base of which is the margin of the clypeus; clypeus shallowly emarginate; eyes touching the posterior condyle of the mandibles; face, vertex and cheeks impunctate, dully shining; antennæ slightly thickened beyond the third segment, this considerably shorter than the fourth. Neck rather longer than the head, minutely transversely wrinkled. Shoulders with a small sharp tooth; medial mesothoracic lobe covered with regular, well separated, moderate punctures, confluent along the parapsidal grooves, between these many much smaller ones; parapsidal and lateral grooves distinct; scutellum sculptured similarly to the medial lobe of the mesonotum; sides lobes of mesonotum with fewer coarse punctures than the medial; metapleuræ and propodeum coarsely reticulate. Posterior coxæ minutely transversely wrinkled; apex of first segment of posterior trochanters completely separated from the base by a transverse suture, so that the trochanters appear three-segmented. Wings hyaline, with violaceous reflection; *the cell M_4 triangular, almost linear, veins M_3 and M_4 separating immediately upon separating from M_{1+2}.*

Length 13.5 mm.; forewing 6 mm.; ovipositor 11.5.

♂.—Similar to ♀, the punctures somewhat thicker on mesonotum and occasionally confluent; spiracle on middle of sixth dorsal segment large and conspicuous.

Hab.—Mexico.

Types.—Collection American Entomological Society.

AULACINÆ.

I have treated the North American species of this subfamily in a previous paper,* and the present may be considered as in part supplementing, in part revising it.

The hind coxæ of the males are normal, but in the females are

* Trans. Am. Ent. Soc., xxvii, p. 319.

sculptured on the inner surface with a groove, at the base of which is a well-marked tooth, which in *Pammegischia* and *Aulacus* is greatly prolonged. I have not seen *Aulacus*, but according to Kieffer's figure, it is much less prolonged in *Aulacus* than in *Pammegischia*. These two genera are also united with each other as well as with *Interaulacus* and *Aulacinus* by the absence of any veins except Sc + R + M in the hind wings (Fig. 69). Likewise in these four genera the claws are simple or at most with two teeth beneath (Fig. 39). *Pammegischia* and *Aulacus* are parasitic on *Xiphydria*. The hosts of *Aulacinus* and *Interaulacus* are not known. All other genera so far as known are parasitic on the larvæ of Coleoptera. So that it seems as though these four genera may together form a distinct tribe in contrast to the remaining genera. There is but one known species of *Aulacus*, although most members of the subfamily have been described as belonging to that genus.

Deraiodontus Bradley is a pure synonym of *Pristaulacus* Kieffer. In my former paper therefore substitute for *Deraiodontus* Bradley, *Pristaulacus* Kieffer, and for *Pristaulacus* Kieffer, the new name *Neaulacus*.

The most generalized wing of the family is *Aulacinus* (Fig. 67). Note that R_5 is entire; the base of M_{3+4} distant from r-m. Cell M_4 is very small—rather a specialization, as is also the loss of venation in the hind wings. But the simple tarsal claw is a primitive character. The wing of *Pammegischia ouelletii* (Fig. 68) was figured to show the trouble that may arise from malformations if we do not exercise care. There is an extra cell cut off from first M_2, and R_3 enters the stigma instead of being separated from it by r. Both of these characters are monstrosities. The left hand wing of the type specimen is normal. The wing of *Pammegischia ashmeadi* (Fig. 69) is typical of the genus. A slight advance is shown in the partial loss of R_5. Specialization is also shown in the prolongation of the coxæ of the female. *Pammegischia* and *Aulacus* may together be considered to form a sort of side branch. Going back to *Aulacinus* we find *Interaulacus* (Fig. 70) the first step along another line, from which probably descended the remaining genera. The base of M_{3+4} is still distant from r-m. R_5 is entirely lost. The hind wings are as in *Pammegischia*. But the claws have gained a single tooth. The venation in the remaining

genera is always about the same, and is illustrated by *Odontaulacus editus* (Fig. 71). The hind wings are more generalized than in the preceding. In *Semenovius* they have two distinct cells. In the front wings the base of M_{3+4} and r-m are approximate or joined. In the different genera we have specialization manifesting itself in an increase in the number of teeth on the tarsal claws, varying from two to four (Figs. 40–42).

The mouth-parts are shown in Figs. 24 and 25.

The arrangement of genera in the following table I believe to be as nearly natural as a linear grouping may be.

TABLE TO THE GENERA OF AULACINÆ.

1. Posterior wings without venation, except R + M (Fig. 69); claws simple, or with one or two teeth (AULACINI).....(2).
   Posterior wings with one or two closed cells (Fig. 71); claws with two or more teeth (Figs. 40–42) (PRISTAULACINI).....(5).
2. Anterior wings without R_5 or with only a stump thereof; base of M_{3+4} not far removed from r-m.....(3).
   Anterior wings with R_5 present and complete; base of M_{3+4} far removed from r-m (Fig. 67).....**Aulacinus** Westwood.
   (Type *Aulacus mœrens* Westw.)
3. Claws simple (Fig. 39); posterior coxæ of the female greatly prolonged within to far beyond the insertion of the trochanters; forehead with a crest above the antennæ; two distinct pits on each side below the antennæ.
   Pammegischia Provancher.
   (Type *P. burquei* Provancher.)
   Claws with one or two teeth beneath.....(4).
4. Claws with one tooth beneath; posterior coxæ of female much prolonged within.....**Aulacus** Jurine.
   (Type *A. striatus* Jurine.)
   Claws with two teeth beneath; posterior coxæ of female simple; no frontal crest; pits below the antennæ smaller than in *Pammegischia*; anterior margin of the prothorax with a distinct tooth on each lateral angle.
   Interaulacus n. gen.
   (Type *I. kiefferi* n. sp.)
5. Anterior wings with the base of the longitudinal sector of the free part of M wanting; the base of M_{3+4} far removed from r-m; claws with four teeth beneath.....**Tropaulacus** n. gen.
   (Type *T. torridus* n. sp.)
   Anterior wings with M complete; base of M_{3+4} not far removed from r-m..(6).
6. Claws with two teeth (Fig. 40).....(7).
   Claws with three or more teeth (Figs. 41, 42).....(Pristaulacus Kieffer) (8).
7. Posterior wings with two closed cells (Fig. 71)....**Odontaulacus** Kieffer.
   (Type *Aulacus rufitarsis* Cresson).
   Posteror wings with only one closed cell.....**Semenovius** new name (= *Semenowia* Kieffer, preoc.) (= *Anaulacus* Semenow, preoc.).
   (Type *Aulacus sibiricola* Semenow.)

8. Claws with four teeth (Fig. 42) ... .(9).
Claws with three teeth (Fig. 41); anterior border of the prothorax usually rounded, not bearing a tooth ....Subgen. **Oleisopristes** Bradley.
(Type *Aulacus firmus* Cresson.)
9. Anterior margin of prothorax rounded, not bearing a tooth....**Neaulacus** n. subgen. (= *Pristaulacus* as previously used by me).
(Type *Aulacus occidentalis* Cresson.)
Anterior margin of the prothorax angled, forming a distinct spine or tooth.
Subgen. **Pristaulacus** Kieffer (= *Deraiodontus* Bradley).
(Type *P. chlapowskii* Kieffer.)

PAMMEGISCHIA Provancher.

The following table to our species may be substituted for my previous one.

1. Forehead not at all transversely wrinkled; medial mesothoracic lobe not emarginate anteriorly ....(2).
Forehead transversely wrinkled or reticulate.....(3).
2. Frontal crest distinct; forehead punctured, more especially below; second joint of the antennæ as long as the third. Thorax stained with brown; legs brown and pallid; abdomen and head tawny.
lovei Ashmead.
Frontal crest indistinct; forehead polished and almost impunctate; second joint of the antennæ two-thirds as long as the third. Reddish-tawny all over except the apex of the propodeum brownish.
ouelletii Bradley.
3. Forehead transversely wrinkled, especially below.....(4).
Forehead coarsely and deeply reticulate all over; occiput smooth and polished. Black, basal half of the abdomen except the very base of the petiole red; legs brown, the tibiæ and knees pale .....**ashmeadi** n. sp.
4. Forehead wrinkled, especially below, the wrinkles not especially prominent and somewhat broken, occiput not distinctly wrinkled .....(5).
Forehead all over and occiput mesally with transverse, very prominent, and little broken wrinkles. Reddish-yellow all over, except the upper parts of the head and thorax, the propodeum and the apex of the abdomen black .....**minnesotæ** n. sp.
5. Color black and red, the legs more or less yellow.....(6).
Tawny all over, except the sutures of the thorax above, or the entire thorax and forehead black..... .....**burquei** Provancher.
6. Legs beyond the coxæ, and the face tawny.....**pallipes** Cresson.
Legs beyond the coxæ brown, anterior tibiæ and tarsi and posterior tarsi tawny.....**xiphydriæ** Ashmead.

Pammegischia ouelletii Bradley.

The venation shown in Fig. 68 is abnormal. The left wing of the type shows venation similar to Fig. 69.

Pammegischia burquei Provancher.

Additional localities are as follows: Anglesea, New Jersey; Morgantown, West Virginia, coll. (Dr. A. D. Hopkins, accessions No. 7327 Hopk. W. Va., May 1897, from dead branches of hard maple infested by *Xiphydria albicornis*). The two specimens from West Virginia have the thorax and forehead entirely black.

Pammegischia xiphydriæ Ashmead.

A metatype is precisely like *pallipes* Cresson (type of *weedi* Ashmead) in size, habitus and everything except the greater amount of brown on the legs. I think this species must be the female of *pallipes*. *Lovei* Ashmead, previous to seeing which, I had thought might occupy that position, is distinct.

In the type the ovipositor is broken; in the metatype it is 3 mm. long; the total length 5 mm.

Additional localities: Caroline to Harford, New York, June 15, 1904, Dr. A. D. MacGillivray (metatype, in coll. Cornell Univ.). A specimen collected by Mr. Beutenmüller in the Black Mountains of North Carolina probably belongs here; Muskoka, Ontario (E. P. Van Duzee).

Pammegischia ashmeadi n. sp. (Fig. 69).

♀.—Black; first abdominal segment except base, and base of second red; the knees, tarsi, anterior tibiæ and middle tibiæ in front and at apex pale yellowish; rest of legs beyond the coxæ brown. Frontal crest distinct; forehead deeply and irregularly reticulate; occiput smooth, polished and impunctate; medial mesothoracic lobe somewhat gibbous, with a shallow emargination marked laterally by the two anterior grooves, which are distinct. Projection on posterior coxæ longer than in *P. burquei*; claws simple; posterior wings without venation, except Sc + R + M. Abdomen short and stout; ovipositor about 7 mm. long. Length 8 mm.

Hab.—Montreal, Quebec, one female.

Type.—In the author's collection.

Pammegischia minnesotæ n. sp.

♂.—Reddish tawny; forehead, occiput, dorsum and propodeum black; apical four joints of the abdomen blackish, rest of the abdomen red. Forehead with several very prominent well separated and unbroken transverse wrinkles; the occiput also with distinct wrinkles, especially mesally. Mesonotum very shallowly emarginate, the borders of the emarginations marked by the anterior grooves. Posterior wings without veins; claws simple. Length 7 mm.

Hab.—Lake Vermillion, northern Minnesota, O. Luger.

Type.—U. S. Nat. Mus.

INTERAULACUS n. gen.

Type.—I. kiefferi n. sp.

This genus is a sort of connecting link between the Aulacini and the Pristaulacini. The genus is entirely South American so far as I know. Besides the type, *Pristaulacus caudatus* and *P. tricolor* Szepligeti, and perhaps *P. hæmorrhoidellus* Westwood belong to this genus, as doubtless do other described species.

Interaulacus kiefferi n. sp.

♀.—Black; four anterior knees and base of tarsi, base of posterior tarsi and middle of the vaginæ white; anterior tibiæ brown. Forehead and occiput with well-separated round deep punctures, rather regularly scattered over the surface; temples more finely and closely punctured; posterior ocelli nearer the compound eyes than each other; basal four antennal segments in the proportion of 3-3-5-10. Medial mesothoracic lobe gibbous, deeply emarginate, the sides very acute in front, strongly transversely carinate. Posterior metatarsus one-third longer than the remaining joints together; wings hyaline, except the apical margin is fuscous. Petiole long and slender; abdomen slender; ovipositor 12 mm. long. Length 10 mm.

Hab.—Brazil.

Type and two paratypes in the collection of Cornell University.

SEMENOVIUS n. nom.

= *Anaulacus* Semenov, nec. MacLeay (Coleop., 1825).
= *Semenovia* Kieffer, nec Weise (Coleop., 1889).

Type.—Anaulacus sibiricola Semenov.

Kieffer erects *Semenovia** without mentioning any species, but doubtless intended to replace *Anaulacus* Semenov, as the characters given apply to that genus. Unfortunately *Semenovia* is itself preoccupied, and another change becomes necessary.

ODONTAULACUS Kieffer.

Type.—Aulacus rufitarsis Cresson.

Semenov was correct in allying *Aulacus rufitarsis* Cresson with *Anaulacus* Semenov. But Kieffer distinguishes them by the venation of the hind wings, erecting *Odontaulacus* for *Aulacus minor* Cresson and *A. rufitarsis* Cresson, neither being mentioned as type. We may call *rufitarsis* type, as that is the more distinct and common of the two.

In my former paper I suppressed *Aulacus editus, abdominalis* and *bilobatus*. Since then I have examined some hundreds of specimens,

* Spec. Hym. d' Eur. (Andre), vii, bis, p. 382.

and have concluded that they may be recognized. Although closely related and apparently intergrading, certain specimens being of questionable identity, they may for the most part be separated by the following table. *Rufitarsis*, *editus*, and *minor* are western, *abdominalis* and *bilobatus* eastern. Both east and west they seem to be the commonest species of the subfamily, especially *editus* and *rufitarsis* in the west.

1. Abdomen with the apical half black .....(2).
   Abdomen red, the very apex occasionally dusky or black .....(4).
2. Posterior femora and tibiæ dark brown; abdomen with the second and the apex of the first segments dull claret-red; wings clear hyaline. Hab. Canada to Virginia.....**bilobatus** Provancher, ♂, ♀.
   Legs black, except tarsi are yellowish; abdomen more of a brick-red; wings stained smoky. Hab.—Rocky Mountains and west.
   rufitarsis Cresson, ♂.
   Legs red or yellowish; abdomen brick-red or yellowish. Hab.—Washington and Nevada..... ....(3).
3. Legs obscurely yellowish or rufous; posterior tibiæ and tarsi brown; species slender.....**minor** Cresson, ♂, ♀.
   Legs all yellowish; species more robust.....**editus** Cresson, ♂.
4. Legs all black, except posterior tarsi. Hab.—Colorado.
   rufitarsis Cresson, ♀.
   Legs, at least four anterior pairs, rufous..... ... .(5).
5. Posterior femora black or dark brown. Hab.—Canada and New England.
   abdominalis Cresson, ♀.
   Posterior femora and sometimes tibiæ red; wings often smoky, with violaceous reflection. Hab.—Nevada and California to British Columbia.
   editus Cresson, ♀.

Odontaulacus editus Cresson (Fig. 24).

Nevada; Washington (Easton, T. Kincaid; Blue Mountains, July 15, '96, coll. C. V. Piper); California (Santa Cruz Mountains); British Columbia (Revelstoke, Selkirk Mountains, 26 spec., collected by the author, July 8, '05.

Odontaulacus rufitarsis Cresson.

Colorado; Washington (Easton, T. Kincaid).

Odontaulacus abdominalis Cresson.

Georgia; Canada; New Hampshire (Webster, coll. W. F. Fiske).

Odontaulacus bilobatus Provancher (Fig. 25).

Canada (Terrebonne, P. Q., July 20, 1901, coll. C. J. Ouellet); West Virginia (Dr. A. D. Hopkins).

TROPAULACUS n. gen.

Head quadrate; a distinct pit below the antennæ on each side; clypeus mucronate, separated by a suture from the face; antennæ 14-segmented, the last segment flattened, obtusely truncate, concave above. Mesonotum forming a part of both cephalic and dorsal walls of the thorax, so that the insect appears slightly hump-backed, but the medial lobe not very gibbous; pronotum without teeth on the anterior margin. In the front wings the base of the longitudinal sector of the free part of M is wanting, as in most Ichneumonidæ, but represented by a stump of a vein, the cells R + 1st R_1 and M_4 being thus partly united; the free part of M_{3+4} separating a greater distance than its own length basad of the posterior end of the radio-medial cross vein; the position of R_5 indicate by a bulla, and a trace of a stump where it formerly joined M_1, which is somewhat angled at that spot; hind wings with all veins obsolescent except M and M_{1+2} and $R_5 + M_1$ and $R_{4+5} + M_1$. Claws with four distinct teeth beneath, and sometimes a scarcely defined fifth.

Tropaulacus torridus n. sp.

♀.—Brown; the antennæ except pedicel and first and last four segments of the flagellum, entire head except spot below ocelli, legs except the coxæ, trochanters, and middle of the femora of the posterior pair, petiole and vaginæ except apex yellow; tip of mandibles, apex of the antennæ and of the vaginæ black. Anterior half of front wings and apex deep brown, rest yellowish-hyaline except the margin, somewhat smoky; entire body clothed with short yellow pubescence.

Head from above quadrate, the ocelli considerably forward of a line connecting the posterior margins of the compound eyes; clypeus mucronate, a deep pit below each antenna; compound eyes removed from the base of the mandibles by more than the length of the pedicel; head impunctate, weakly shining; first three segments of the flagellum in the proportions of 3–4.5–4.1; flagellum beyond the first segment covered with rows of whitish scales. Mesonotum scarcely gibbous, mesally emarginate, transversely rugose, the parapsidal grooves distinct, scutellum with wrinkles concentric around its apex; propodeum reticulate; posterior coxæ weakly wrinkled. Triangular spot at apex of Cu_1, all of M_3, first and second M_2, M_1 caudal third of R_5, half of R_4 and two-thirds of R_3, yellowish hyaline, the margin of M_1 and second M_2 stained somewhat smoky; rest of front wing deep brown, posterior wings yellowish hyaline, a faintly brownish mark along the upper and outer border, Cu and Cu_1 obsolescent, transverse sector of the free part of M somewhat so. Abdomen short, clavate, petiole distinct. Length 10.5 mm.; antennæ 7 mm.; front wing 9 mm.; ovipositor 7 mm.

One female, Brownsville, Texas, June, coll. Univ. of Kansas.

By its peculiarly marked wings this species is very different in appearance from any other of our nearctic Aulacinæ, indeed, coming as it does from Brownsville, in the extreme south end of the exten-

sion of the tropical region into Texas, may be considered as a fundamentally neotropical species, an affinity further corroborated by its coloring.

I am indebted to Mr. Henry L. Viereck for permission to study and describe this form.

PRISTAULACUS Kieffer.

I think it will be best to group *Oleisoprister*, *Neaulacus* and *Pristaulacus* sen. str. together as subgenera of Kieffer's *Pristaulacus*

Pristaulacus (Oleisoprister) dentatus n. sp.

♂.—Black; tarsi brown, apical half of petiole (more ventrally) and basal two-thirds of second segment red. Head smooth and polished with only fine setigerous punctures. Medial mesothoracic lobe somewhat gibbous, shallowly emarginate; prothorax with a slight blunt irregular tooth on the antero-lateral angle. Posterior metatarsus one-eighth longer than the remaining joints together, three times as long as the second joint; wings hyaline, except a large fuscous spot beneath the stigma. Petiole distinct but short. Length 9 mm.

The tooth on the lateral angles of the prothorax will distinguish this species from all others.

Hab.—Ormsby County, Nevada, C. F. Baker.

Type.—In the coll. C. F. Baker, Para, Brazil.

Pristaulacus (Oleisoprister) firmus Cresson.

The only example that I have seen besides the unique type is a female sent me by Prof. C. V. Piper from Mt. Rainier, Washington.

Pristaulacus (Oleisoprister) resutorivorus Westwood.

Olympia, Washington, one female.

Pristaulacus (Oleisoprister) abbottii Westwood.

Washington, D. C.; Marquette, Michigan, April 7th.

Pristaulacus (Oleisoprister) stigmaterus Cresson.

Missouri; Norton's Landing, Cayuga Lake, New York, June 21st.

NEAULACUS n. subgen.

Type.—*Aulacus occidentalis* Cresson.

Coextensive with *Pristaulacus* as used in my former paper.

Pristaulacus flavipes Kieffer, Arkiv. f. Zool., I, p. 559, probably belongs here.

Pristaulacus (Neaulacus) occidentalis Cresson.

Blue Mountains, Washington, July 15th, three males, one female; Beulah, New Mexico, coll. Viereck; Idaho.

Pristaulacus (Neaulacus) mellens Cresson.

Corvallis, Oregon, July 21st.

Pristaulacus (Neaulacus) pacificus Cresson.

Corvallis, Oregon, July 15th.

Pristaulacus (Neaulacus) fasciatus Say.

Michigan, coll. Townsend; Cadet, Missouri, coll. J. C. Barlow; Pennsylvania (two specimens in coll. A. E. S.); Marion County, Arkansas (J. C. Bridwell).

PRISTAULACUS Kieffer.

Type.—Pristaulacus chlapowskii Kieffer.

Embraces those species included under *Deraiodontus* in my former paper.

TABLE TO THE SPECIES OF PRISTAULACUS.

1. Wings dark violaceous. Black, except more or less of the legs, and in the male the apical half of the antennæ are yellow..**violaceus** Bradley.
   Wings hyaline or slightly clouded, sometimes with fuscous spots and a violaceous reflection.....(2).
2. Ultimate tooth on the tarsal claw beneath shorter than the penultimate; medial mesothoracic lobe gibbous and emarginate. Black; apex of the petiole and legs beyond coxæ red..... **hopkinsi** n. sp.
   Ultimate tooth on the tarsal claw longer than the penultimate (Fig. 42)...(3).
3. Medial mesothoracic lobe strongly gibbous.....(4).
   Medial mesothoracic lobe not strongly gibbous.....(5).
4. Wings hyaline, without violaceous reflection. Abdomen black, except the first ventral segment sometimes dull rufous.....**niger** Shuckard.
   Wings of the female showing strong violaceous reflection; mesopleuræ shallowly punctured, wrinkled above. Abdomen rufous, marked with black.....**montanus** Cresson.
5. Wings showing strong violaceous reflection in the female; much fuscous present in the basal portion, paler in the male; mesopleuræ deeply irregularly reticulated; petiole short. Legs black.
   fuscalatus Bradley.
   Wings without violaceous reflection, or more than a trace of fuscous in the basal portion; petiole long; legs flavous....**flavicrurus** Bradley.

Pristaulacus violaceus Bradley, Zeits. f. Hym. u. Dipt., v, p. 26.

This species may be distinguished from the others by the dark violaceous wings.

Pristaulacus hopkinsii n. sp.

♀.—Black; apex of petiole and legs beyond the coxæ uniform dull red. Has the ultimate tooth on the tarsal claw shorter than the penultimate. Closely resembles *Oleisopristes resutorivorus* Westwood, but has the middle lobe of the mesonotum gibbous and emarginate much more than in that species. Margin of pronotum has a sharp tooth.

Hab.—Kirbyville, Texas, November 11, '02, Dr. A. D. Hopkins. *Type* and one paratype, accessions No. 1231d Hopkins, U. S., deposited in the author's collection; another paratype in collection Amer. Ent. Soc.

Pristaulacus niger Shuckard.

Lake Pleasant, New York, July 20, '87; Albany, New York, September 21, 1900; Joliette, P. Q., Can., July 24, C. J. Ouellet.

Pristaulacus montanus Cresson.

From the Santa Cruz Mountains, California.

Pristaulacus fuscalatus Bradley.

♂.—Last four segments of abdomen black; wings without violaceous reflection, the fuscous bands present but paler, especially the basal ones.

Claremont, California, C. F. Baker; Los Angeles County, California (metatype, ♀).

Pristaulacus flavicrurus Bradley.

The U. S. National Museum collection contains a metatype from Agric. Coll., Michigan; Keene Valley, Essex County, New York, July 24, 1890, collection New York State Museum.

EVANIINÆ.

1887, Evaniinæ, Cameron, Biol. Centr. Amer., p. 422.

The prevalent color is black, and this is sometimes varied with red, less often with yellow and sometimes a little white on the legs or antennæ. The head, body and legs are covered with a short yellowish or whitish pubescence, sometimes thick enough to obscure the sculpture, especially on the metaventer, producing on the sides, head and propodeum of some species a bright silvery sheen.

The head is transverse to tranverse-quadrate, very different from the head of either of the other two subfamilies; it is most like that of Aulacinæ, but when seen from the side is less convex in front, and pointed or attenuated above instead of rounded; in the Fœninæ the head is long, oval, and so attached as to normally throw the face in plane with the dorsum; in Evaniinæ the face is always at right angles to the plane of the dorsum. Posteriorly the entire head is concave, usually deeply so, and the rim where the concave posterior part meets the convex anterior is usually accentuated by a little ridge marking what I have called the posterior angle of the occiput and temples; in the Aulacinæ it is somewhat similar, but in the Fœninæ

the posterior concavity is reduced to a small cup like pit in which the neck is inserted, and the rest of the posterior (in this case lower) portion is convex and not separated from the temples. Seen from above, that is looking squarely down on the vertex (Figs. 10, 13 and 15), the head of Evaniinæ is transverse to almost transverse quadrate and shows a varying distance between the eyes and the posterior margin of the occiput. The sides may be inflated, square or rounded behind the eyes. The ocelli are three in number; the anterior one sometimes somewhat transverse. Whether or not the posterior ones are nearer to each other or to the compound eyes is a character of specific value. The eyes from this view may be prominent or not. The profile of the head varies in shape (Figs. 9, 14, 16 and 17). It is nearly always broadest below the middle, and narrowed, even bluntly pointed at the vertex. The forehead may be plain or convex. The eye is always more or less slanting, making the temples broadest below, and it is of varying length, extending in *Evaniella californica* (Fig. 9) scarcely below the insertion of the antennæ, but usually much below this, never, however, very closely approaching the mandibles. From in front the head varies from round to nearly triangular, or may be somewhat oblong, as in *Acanthinevania princeps* and *A. longigena*, etc. The eyes from this position may or may not be prominent; their inner margins are parallel, or somewhat converging. The mandibles have one or more blunt lobes within. The clypeus is usually mucronate or obtusely pointed, not separated from the face above, but sometimes set off laterally by a short groove; together with the face it is often swollen or broadly convex. There may be a longitudinal carina in the middle of the face and one on each side, and frequently in in Evaniini a short longitudinal interantennal carina. The antennæ (Figs. 55 and 59) are situated at varying distances apart, usually about the height of the middle of the eyes, but sometimes as low as the base, depending more on the length of the eyes than difference in the actual position of the antennæ. The scape in Evaniinæ and at least sometimes in Hyptiini is much longer in the female than in the male. The second joint is ordinarily very short, sometimes not so, and this I have always called the pedicel. I have counted the flagellum as beginning with the third joint, the relations of which to the fourth are of specific value. There are thirteen joints altogether in each sex. In the female the flagellum is

sometimes thickened, particularly in *Semæomyia*, where it is strongly incrassated beyond the middle, see Fig. 55. The forehead is more or less convex in Hyptiini, but in Evaniinæ it is concave, forming a distinct basin in which the two antennæ are inserted, and this is bordered below and usually laterally by a distinct carina or rim.

I have studied the mouth-parts from glycerine mounts of all the genera but two (Pl. VIII), and find that the maxillary palpi are 5 jointed, the palpiger distinct, and the labial palpi usually 4-jointed, in *Hyptia* 3 jointed (Fig. 37). In *Evania* and especially in *Hyptia* the third joint of the labial palpi is strongly inflated, and sub-triangular (Figs. 28 and 29); the labium in *Evania* is broadly oval, highly chitinized and conceals the rather short ligula; this is also true in *Hyptia*, but in that genus the labium is broader, rather pear-shaped; in *Acanthinevania* (Figs. 26) it consists of two narrow chitinized plates, which do not conceal the long lingula; in *Evanicella* (Fig. 35) the arrangement is similar, but the labium is a little broader; in *Szepligetella* the ligula is long, but the labium broad as in *Evania*.

The neck is short, shorter than in Aulacinæ and much shorter than in Fœninæ, so that the head normally covers the collar or pronotum (Fig. 18). If we remove the head and look at the thorax from in front (Fig. 19), we will see the pronotum as an irregular transverse piece forming the upper and side margin of the cavity vacuated by the neck, extending down laterally in a narrow point almost to the coxæ (Fig. 19). The upper margin is more or less arcuate, sometimes nearly straight and extends back below the mesonotum to the tegulæ. The shoulders, spoken of as the humeral angles (Fig. 19), may be entirely rounded, or sharply angled, and this character is very useful in classification. Below the cavity of the neck, and somewhat depressed, are two oval sclerites, which represent the propleuræ (Fig. 19), and adjoin the procoxæ below; the latter are in juxtaposition (Fig. 19).

If we examine the dorsum from above we will see the mesonotum as a large piece, rounded in front and extending backward to behind the anterior wings, where a straight transverse suture separates it from the scutellum. The latter is indistinct in North American Hyptiæ, so that the mesonotum and scutellum superficially appear as one piece. The mesonotum is of varying degrees of convexity, but never gibbous, as in Aulacinæ. The maximum number of

grooves on it are as follows: a regularly curved groove on each side extending from the posterior to the anterior margins, spoken of as the parapsidal groove: a short longitudinal groove on each side between these and the tegulæ, called the lateral grooves: and two very short grooves in the middle extending backwards from the anterior margin, called the anterior grooves. These are all present in *E. appendigaster*, and form good characters for separating species. The mesopleuræ (Fig. 18) are oblique rhomboidal sclerites, partially separated from the mesoventer only by an obscure groove. An oblique sulcus traverses it in which the femora of the middle legs may be fitted, when drawn up, and which together with the posterior part is highly polished in *Hyptia*. Anterior to this sulcus the sclerite is rounded out and full, forming what I have called the anterior swelling. The entire venter is usually more finely punctured than the other sclerites. The middle coxæ occasionally are placed far posteriorly, thus prolonging the mesoventer; the latter is mesally divided by a longitudinal suture, and ends between the coxæ in a bifurcate process or furcula. The middle coxæ are placed wider apart than the posterior, but the ratio of the two distances varies in different species. The metaventer is similar, but undivided from the metapleuræ, and without a medial sinus. The posterior coxæ are more or less closely placed, and the furcula in which the metaventer ends is of primary specific importance; the lobes or tynes may be mere knobs (as generally in *Hyptia*), or may be elongate, parallel (Fig. 64) or divergent (Fig. 66) processes. The metapleura (Fig. 18) is roughly triangular, with its apex beneath the posterior wings; it is often not separated posteriorly from the propodeum. The scutellum is a large nearly quadrate piece. Directly behind it and sunk in a deep depression, forming scarcely more than a transverse line, is a sclerite that I have called the metanotum, although it may be the postscutellum (Figs. 62 and 63). If looked at from the side this sclerite seems to form the bottom of a narrow groove, which, in Evaniinæ, has very steep walls, in Hyptiini these walls are more sloping, a difference illustrated by Figs. 62 and 63.

The distance from the metanotum to the insertion of the petiole varies, but is approximately and on the average a little less than the length of the petiole, and about the length of the scutellum; behind this the propodeum is produced a short distance and then

slopes off more or less abruptly into the posterior face or truncature, which may be flat, convex or concave, with a mesal angle. The propodeum is almost always reticulate, except above the petiole, where it may be punctured or rugose. In the genus *Hyptia* the shape of the reticulations on the sides just behind and perhaps extending over the metapleuræ is of prime specific importance (Pl. V).

The abdomen in the female Evaniini is about the shape of an isosceles triangle, base uppermost, and the outer angle with the pygidium produced into a point from which the ovipositor may be exserted (Fig. 18). In the male it is narrowly oval. Always in *Hyptia* and usually in all Hyptiini the abdomen of the male and female are alike, round and without any visible sign of ovipositor; often it is impossible to distinguish the sexes. In both tribes the petiole is long, flattened below, and often striate or punctured, especially on the sides; it is not enlarged apically and is distinctly separated from the rest of the abdomen. The abdomen proper is highly chitinized; in every species I have seen, smooth, black and polished; it is very strongly compressed; the ventral segments only narrowly exposed; these also chitinized and forming a sharp mesal keel at the lower edge of the abdomen. The ovipositor is never exserted.

The posterior coxæ are grooved above for the reception of the femora. In all genera except *Hyptia*, and probably *Evaniellus*, the posterior legs are very elongate (Fig. 60); in the former genus they are only the length of the body, and the posterior tibiæ are distinctly thickened at their apex (Fig. 61). In two genera the posterior legs bear numerous strong spines in rows; also in *Hyptia* there are rows of very minute spines, visible only with favorable light and under a strong lens, or more distinct in one species. The posterior tibiæ are armed with two long spurs, and the proportion of the longer of these to the metatarsus (first tarsal joint) is of specific importance. The proportion of the metatarsus to the following joints is also important, but is nearly fixed in *Hyptia*. In all genera there is a distinct tooth within the tarsal claw (Figs. 44–54), and the shape and position of this and its angle with the outer ray is of specific value in some genera, but nearly constant in *Hyptia*. Sometimes as in *Zeuxevania* (Fig. 50) and *Semæomyia* (Fig. 51) the claw is bifid, and the inner ray much stouter and longer than the outer.

The wings of the subfamily are of special interest, inasmuch as we find in them a very complete series showing specialization by atrophy, from the condition found in *Evania* as the most generalized to that found in *Evaniellus* at the other end of the group. The wing of *Evania appendigaster* (Fig. 76) is as generalized as any I know of in the subfamily, with the exception of a few which show R_4 more distinctly (see Fig. 75). C and Sc + R + M are separated as in Aulacinæ and Gasteruptioninæ, forming a distinct cell C; R_5 after separating from R_4 bends either obtusely or acutely or at right angles upward, and reaches the margin from one-third to two-thirds the distance from the stigma to the apex, but the angle at which it bends seems not to be entirely constant within a species. As has been stated R_4 is present in the most generalized type (Fig. 75), but it is always partly atrophied, and usually there is only a stump or no trace at all of it left. R_5 is never present. M separates from R within or close to the stigma, running almost backward till it reaches m-cu when it turns at right angles; m-cu is thus very long, and the cell R + 1st R_1 is diamond shaped. But in *Zeuxevania* (Figs. 80–81) M separates from Sc + R about two thirds of the way from the base of the wing to the stigma, or the base of M is entirely wanting, if present it runs backward a short distance and joins m-cu, this vein being much shorter than in *Evania*, and continuing in an unbroken curve with the longitudinal part of M. After R_4 the next vein to become atrophied is M_{1+2} and M_1 at its base, and later along its whole length together with m and the longitudinal part of M_2 (Figs. 76–80). A trace of these may generally be seen except in *Evaniellus*, *Hyptia*, *Semœodogaster* and *Semœomyia* (Figs. 84–87); in *Evaniscus* (Fig. 82) the longitudinal part of the base of M (from m-cu to separation of M_{3+4}) is lost; *Zeuxevania* (Figs. 80 and 81), which has been described, seems to be the next modification, and along a different line, the only instance which involves modification of the position rather than atrophy of the nervures. In *Semœodogaster* and *Semœomyia* R_{s_1} all of M beyond m-cu except a longitudinal vein representing a portion of M_4 and M_3, and except M_4, Cu_1, and M_4+Cu_1 + 1st + 2nd + 3rd A are lost; so that we have only three closed cells left, namely C, M and Cu + Cu_1; the next step is in *Hyptia* (Fig. 86), where only C, Sc + R + M, the stigma, a trace of R and R_{s_1}, Cu and M_4 remain. The forewings are also broader than in the other genera, except

Semœodogaster. The climax of the series is reached in *Evaniellus* (Fig. 87), where only C, Sc + R + M and the stigma remain. This genus is at the summit of the family so far as the specialization of its wings is concerned. The posterior wings of all the genera have an almost separated posterior lobe (Figs. 76 and 86); there is never more than R + M present along the costal margin and another vein within, and frequently this latter vein is also lost. It probably is Cu and M_4. The wings are hyaline, with the exceptions of a few exotic species.

In 1887 Cameron first recognized this subfamily including in it *Gasteruption* (*Fœnus*). The date on Cameron's paper is November. Almost simultaneously Cresson recognized the subfamily in his "Synopsis of the Hymenoptera North of Mexico," dated 1887, without statement of the month. The copy before me was received by the Cornell Library, December 28, 1887, so that it is likely that Cameron's paper antedated Cresson's, as the later was probably mailed to Cornell immediately on publication. Kieffer also gives Cameron credit for the subfamily. Schletterer in his monograph recognized the subfamily, and placed *Gasteruption* in Aulacinæ, instead of Evaniinæ, and Ashmead in Smith's "Catalogue of the Insects of New Jersey," 1900, p. 563, recognized it, but as including *Gasteruption*. In his "Classification of the Ichneumonoidea," 1901, Ashmead separated *Gasteruption* from the Evaniinæ, and in this last sense the subfamily was recognized in my paper on "North American Evaniidæ," Tr. Amer. Ent. Soc., 1901, and by Kieffer in the "Genera Insectorum," 1902.

Up to the time of Schletterer's monograph of the family, three genera had been recognized, *Evania*, *Hyptia* and *Brachygaster*. Dr. Schletterer threw these all together into the single genus *Evania*. Recently Kieffer has recognized a new genus, *Zeuxevania*; Szepligeti *Evaniscus*; and Enderlein *Evaniellus*; shortly before Enderlein erected *Evaniellus* I established an *Evaniella*, and here describe three other genera. *Pseudevania* is a misprint for *Zeuxevania*.

Evania is of almost world wide distribution, being found in every region except the Australian, in which one species, perhaps accidental, occurs, and three others just over the boarder line from the Oriental. But *Evania appendigaster* is believed to have spread from Europe to all regions, and is everywhere one of the commonest species.

Acanthinevania occurs chiefly in the Australian region, and also five species in the Malayan subregion of the Oriental; two African species possibly belong here. There are about thirty-three species.

Of *Szepligetella* only one species is known, from the Hawaiian Islands.

Evaniscus occurs in the Neotropical regions, where there are three species.

Zeuxevania has two species in the Palearctic, two in the Ethiopian and two in the Oriental.

Evaniella is known certainly only from the United States, Central and South America, but many species at least South and Central American credited to *Evania* probably really belong here. There are five species recognized.

Semæomyia occurs in the Neotropical with seventeen species.

Semæodogaster has but one species, European.

Hyptia has thirty-one species from the Nearctic and Neotropical regions.

Evaniellus has four species from the Neotropical.

As far as is known all the genera are parasitic on the oothecæ of cockroaches.

As showing the distribution of the genera the table on the next page will be of interest. Thirteen species of uncertain generic position are omitted. *Evania appendigaster* is counted only from Europe, which is believed to be its original habitat.

		Evania	Acanthinevania	Szepligetella	Evaniscus	Zeuxevania	Evaniella	Semæomyia	Semæodogaster	Hyptia	Evaniellus
Palearctic	Mantchurian	1	....	....	....	....	....	....	....	....	....
	Mediterranean	4	....	....	.. .	2	....	....	1	....	....
	European	2[3]	....	....	....	....	....	....	1	....	....
	Siberian	....	....	....	....	....	....	....	....	....	....
	Total	6*	....	....	....	2	..	....	1*	....	....
Nearctic	Boreal	....	....	....	....	....	....	....	....	....	....
	Humid Transition and Austral	1	....	....	....	....	1	....	....	9	....
	Arid Austral	....	....	....	....	....	1	....	....	....	....
	Pacific Coast Transition	....	....	....	....	....	1	....	....	....	....
	Total	1	....	....	....	....	3	....	....	9	....
Neotropical	Antillean	....	....	....	....	....	1	....	....	7	....
	Central American	12	....	....	1	....	....	2	....	5	....
	Brazilian	20	....	....	2	....	1	15	....	8	4
	Argentinian	3	....	....	....	....	....	1	....	3	....
	Total	35[5]	....	....	3	....	25	17*	....	22*	4
Ethiopian	Saharan	1	....	....	....	....	....	....	....	....	....
	West African	3	72*	....	....	....	....	....	....	....	....
	South African	2	....	....	....	2	....	....	....	....	....
	Mascarene	1	....	....	....	....	....	....	....	....	....
	Total	7	2	....	....	2	....	....	....	....	....
Oriental	Hindostan	2	....	....	....	....	....	....	....	....	....
	Ceylonese	4	....	....	....	....	....	....	....	....	....
	Indo-Chinese	2	....	....	....	....	....	....	....	....	....
	Malayan	7	7	....	....	2	....	....	....	....	....
	Total	14*	7	....	....	2	....	....	....	....	....
Australian	Papuan	3[2]	7	....	....	....	....	....	....	....	....
	Australian	1	19	....	....	....	....	....	....	....	....
	Polynesian	....	1	....	....	....	....	....	....	....	....
	Novo-Zealanian	....	....	....	....	....	....	....	....	....	....
	Hawaiian	....	....	1	....	....	....	....	....	....	....
	Total	4	24*	1	....	....	....	....	....	....	....
	Total species	63[5]	33	1	3	6	5[5]	17	1	31	4

* Species included in two or more subregions counted only once.
[2] These three species from Lombok, just over the border of the Indo-Malayan, in which they may be looked upon as belonging.
[3] *Evania appendigaster* is counted only from the European, although it has become cosmopolitan.

TABLE TO THE GENERA OF NORTH AMERICAN EVANIINÆ.

1. Abdomen of the female distinctly triangular, the apex produced into a short process from which issues the ovipositor (Fig. 18); abdomen of the male more or less narrowly oval; antennæ inserted in a single distinctly impressed basin, bordered at least on the lower side by a ridge; usually an inter-antennal carina present; metanotum as seen from the side more or less deeply depressed, sides of the depression abrupt (Fig. 62), (Tribe EVANIINI).....(2).

Abdomen of the female nearly circular (rarely somewhat triangular), the apex not produced into a process (or rarely slightly produced in *Evaniella*), abdomen of the male the same shape as in the female (sometimes oval in *Evaniella*); antennæ not inserted in a distinctly impressed basin, without any carina below them, rarely between them; metanotum as seen from the side less deeply depressed, the sides of the depression sloping gradually (Fig. 63), (Tribe HYPTIINI).....(3).

2. Front wings with the maximum number of veins found in the subfamily, except parts of R_4, M_{1+2}, M_1, M_2, and m may be more or less atrophied; labium modified into a highly chitinized pear-shaped plate which nearly covers and conceals the ligula (Figs. 28-29).

Evania Fabricius.

3. Wings with seven completely closed cells (Fig. 83), hind legs long, exceeding the whole length of the insect.....**Evaniella** Bradley.

Wings with only the costal cell completely closed (Fig. 86); hind legs much shorter and stouter than in any other genus of the subfamily, not exceeding the total length of the body (Fig. 61).....**Hyptia** Illiger.

EVANIA Fabricius.

Ichneumon, *Sphex*, etc., auct.

1775. *Evania* Fabricius, Syst. Ent., p. 345.

Type—*Evania appendigaster* Linnaeus.

The scape of the antennæ of the female is much longer than in the male. The proportions in actual measurements of the antennal joints are surprisingly constant in the North American species. The labium is highly chitinized and broadly oval, dilated at the base, almost concealing the short ligula (Figs. 28 and 29). The labial palpi have the third joint greatly dilated and triangular. The forehead has an impressed basin in which the antennæ are inserted, bordered by a distinct rim below; there is usually a short inter-antennal carina, and may be a mesal and two lateral carinæ on the clypeus. The sculpture of the face and mesonotum is of prime importance; in one of our North American species the face is closely striate, in the other with a very few small scattered punctures.

The mesopleuræ do not show a distinctly smooth and polished

area. The groove for the reception of the middle femora is not very deep. The sides of the propodeum are not peculiarly sculptured, as in *Hyptia*. The metanotum is sunk deeply between abrupt walls formed by the scutellum and propodeum (Fig. 62). The furcula forming the posterior border of the mesaventer is of great importance and may be with parallel or divergent lobes or tynes (Figs. 64 and 65).

The abdomen of the female is the shape of an isosceles triangle, the pygidium being produced into a projection which contains the ovipositor (Fig. 18). In the male the abdomen is oval.

The posterior legs are long (Fig. 60), and always without spines. The proportion of the longer tibial spur to the metatarsus is of importance, as also that of the metatarsus to joints two to four together. The shape of the tooth on the tarsal claw and its size and angle are of importance (Figs. 44 and 45).

The wings are as shown in Figs. 76 and 77.

The genus is the most generalized of the subfamily. It is distributed throughout the world, except in the Australian region, where one, perhaps accidental, species is found, and three others just over the border in the Island of Lombok. But *Evania appendigaster*, believed to be originally European, has been introduced into every country.

TABLE TO THE NORTH AMERICAN SPECIES OF EVANIA.

1. Face with only a few small punctures; tarsal claws with two rays placed so as to form an acute angle, the inner one shorter (Fig. 44); antennæ inserted close together in a broad shallow basin, with an abrupt but scarcely ridged front margin ..... **appendigaster** Linnaeus.

Face coarsely longitudinally striate; tarsal claw bearing a tooth within nearly at right angles to the outer ray (Fig. 45); antennæ situated rather far apart in a deep and well-marked basin, the anterior and lateral margins of which are limited by a distinct carina, with a sharp angle in the centre below the antennæ ..... **urbana** n. sp.

Evania appendigaster Linnaeus.

(Figs. 13, 17, 18, 27, 28, 29, 44, 56, 60, 62, 76.)

1742. *Ichneumon* Reamur, Mem. Hist. Ins., T. vi, p. 332, tab. xxxi, fig. 13.
1758. *Ichneumon appendigaster* Linnaeus, Syst. Natur., ed. 10, p. 566.
1767. *Sphex appendigaster* Linnaeus, Syst. Natur., ed. 12, p. 943.
1775. *Evania appendigaster* Fabricius, Syst. Ent., p. 345.
1780. *Ichneumon niger* Göze, DeGeer, Abhand. Gesch. Insect., iii, p. 385, pl. 30, figs. 14 and 15.
1791. *Evania lævigata* Olivier, Encyc. Mèth. Insect., vi, p. 453.
1791. *Evania maculata* Olivier, Encyc. Mèth. Insect., vi, p. 453.*
1807. *Evania fuscipes* Illiger, Rossi, Faun. Etrusca., ed. 2, p. 83, No. 798, ii.

1824. *Evania unicolor* Say, Keat. Narrat. Exped., ii, App. p. 320.
1829. *Evania flavicornis* Curtis, Brit. Entom., vi, p. 257.
1830. *Evania cubæ* Eichwald, Zool. Spec., ii, p. 214.
1840. *Evania desjardinsii* Blanchard, Hist. Anat. Insect., iii, p. 299, fig. 74.
1841. *Evania affinis* Guillou, Ann. Soc. Ent. France, x, p. 311.

♂, ♀.—Entirely black. Covered with a very fine and inconspicuous griseous pubescence. Face convex below the antennæ, smooth, a few punctulations scattered at considerable and irregular distances; antennæ inserted close together in a broad but shallow basin, with an abrupt but scarcely ridged front margin, extending laterally almost to the eyes and posteriorly without definite limit to in front of the ocelli; vertex narrow; middle ocellus transverse; temples narrow above, wider towards the base of the eyes; eyes removed by more than half their length from the mandibles; antennæ long, filiform, somewhat thickened in the female (Fig. 56); average measurements as below:

		Scape	Ped.	3	4	5	6	7	8	9	10	11	12	13	Flag.	Total
♂	mm.	1.06	.17	.71	.66	.62	.60	.54	.50	.45	.43	.39	.40	.52	5.81	7.04
♀	mm.	1.42	.18	.76	.58	.49	.46	.38	.37	.34	.33	.30	.26	.36	4.64	6.23

Thorax above with a few round pits scattered sparingly over it, larger and better defined than those similarly scattered over the face; parapsidal grooves clearly defined; anterior grooves short; venter and sides of the thorax with larger and more deeply impressed round pits, distant from each other, but growing denser posteriorly until on the propodeum they merge into coarse reticulation: metanotum sunk in a deep and narrow transverse groove; furcula with divergent tynes.

Middle coxæ widely separated; posterior coxæ subapproximate, sparingly, finely, punctured; posterior tibia with the longer spur about one-third the length of the metatarsus (Fig. 60); the latter about the length of the succeeding two joints united; claws large, two-thirds as long as the fourth tarsal joint, toothed, the rays slender, placed at acute angles with each other, the apical one much the longer (Fig. 44). Wings hyaline (Fig. 76), the free part of R_4 wanting, sometimes a faint line indicating its position; R_3 obtusely angled beyond R_4; the base of M_1+_2 usually more or less atrophied; hind wings without an open costal margin.

Abdomen of the male oval, two-thirds as broad as long; the petiole nearly as long as the remaining part; the second segment but little larger than the first of the four succeeding fully exposed segments which diminish in breadth towards the apex; abdomen of the female an isosceles, almost equilateral triangle with the apex caudad and the dorsal hypothenuse somewhat convex (Fig. 18); the petiole less than half the length of the dorsal hypothenuse; the second segment but little broader than the first of the three following fully exposed segments; the apical segment produced into a short dorso-caudad projecting process concealing the ovipositor.

* The reference given in Schletterer and Dalla Torre to *E. flavicornis* Oliv., Encyc. Méth. Insect., vi, p. 453, is not to be found, and should evidently be *maculata*.

Hab.—Distributed throughout the world, and almost everywhere the most abundant species. It is believed to have originally inhabited Europe from whence it has become naturalized in almost all countries along with the Blattidæ on which it is parasitic. In the United States it seems chiefly confined to the east, and is especially common in some of the larger cities. Say's *unicolor* was from the Rocky Mountains, but we have no other records from that far west. It has never been taken here at Ithaca, nor have I seen specimens from north or west of here.

Evania urbana n. sp.

(Figs. 45, 66, 77.)

♂, ♀.—Black. Sericeous pubescent, especially the face and propodeum, shining silvery in certain lights. Face subconvex below the antennæ, which are situated rather far apart in a deep and very well defined basin, the anterior and lateral margins of which are limited by a distinct ridge which starts from a central point on the face below the antennæ, running on each side outward and upward, to a short distance from the eyes, where it turns inward again, becoming lost before reaching the ocelli; another carina extends longitudinally between the antennæ traversing the whole length of the basin; as thus defined, the basin is narrower than in *E. appendigaster*; from somewhat within the lower angles of the eyes a groove extends on each side to the inner angles of the mandibles, which, together with the carinæ above described, enclose a shield-shaped area embracing the entire face, which is subcoarsely and regularly longitudinally striate, the striæ converging somewhat towards the apex (clypeus), which appears as a very small triangular smooth and polished piece; the temples are roughly substriate, below the eyes the cheeks are striate similarly to the face, the striæ converging towards the face and mandibles; the vertex is covered with large punctures; the ocelli placed close together, the central ones much smaller than the other two, between the central and each lateral ocellus is a small smooth prominence partly surrounding each ocellus, part of which it at first appears to be; eyes small, prominent, removed by a little less than their length from the mandibles; temples narrow, wider at the base of the eyes; antennæ filiform, somewhat thickened in the female; average measurements as below:

		Scape	Ped.	3	4	5	6	7	8	9	10	11	12	13	Flag.	Total
♂	mm.	.72	.12	.78	.78	.74	.70	.61	.61	.56	.53	.50	.50	.50	6.81	7.65
♀	mm.	1.63	.22	.83	.83	.59	.50	.40	.38	...	...	...	...	...	.....	.....

Thorax above like the vertex, roughly and rather irregularly covered with coarse punctures; the sides, venter, propodeum and posterior coxæ punctate to shallowly reticulate; anterior grooves not evident, lateral and parapsidal grooves very short and barely discernable; metanotum not very deeply sunk, comparatively broad, forming a transverse rather squarely cut trough; furcula with divergent tynes (Fig. 66).

Middle coxæ rather close together; posterior coxæ subapproximate; the longer spur of the posterior tibiæ less than one-third the length of the metatarsus; the latter longer than the rest of the tarsus together; claws large, about two-thirds as long as the fourth tarsal joint, toothed, the rays rather stout, nearly at right angles, the outer one slightly larger (Fig. 45, there is some variation in the size of the inner tooth in the paratypes, but the angle seems constant). Wings hyaline, or slightly clouded in the apical third; the veins dark in the basal part, becoming pale beyond the stigma; R_5 obtusely curved beyond R_4; free part of R_4 wanting; free part of M_1 and M_{1+2} pale, their base wanting (Fig. 77); hind wings with an open costal margin.

Abdomen of the male long, narrow, oblong or oval, almost linear; petiole more than one-third its length, striate; the segments smooth, polished, second to seventh inclusive exposed. Abdomen of the female subtriangular, with the apical angle angle slightly produced into a short process containing the ovipositor; petiole one-half the length of the abdomen, longitudinally striate; the segments smooth, polished; the second almost twice as broad as the third; the second, third, fourth and fifth segments fully exposed, the latter broadly emarginate dorsally, exposing a part of the sixth and seventh segments, which form the process already described; edges of the last two segments and apex of the ovipositor finely ciliate. Length 7 mm.

This pretty silvery shining species is very different in appearance and characters from *E. appendigaster*, or any others that I know. The most obvious characters are the striation of the face and the narrow abdomen of the males, but there are many other important differences. In all I have seen over eight males and seven females.

Five of the males were collected by Mr. Witmer Stone on the windows of his house in Philadelphia. As all the other specimens have also been taken in large cities, I have applied to it the name *urbana*. Mr. Liebeck sends me five more specimens taken on the windows of a house in Philadelphia. It is of course possible that it may represent another exotic species, migrating similarly to *E. appendigaster*. The front legs and antennæ are sometimes more or less pale.

Hab.—Philadelphia, Pa., August 5th (Mr. Stone); Washington, D. C., July 26, 1900; New York and Brooklyn, N. Y. (Messrs. Daecke, Brues and Franck).

Types.—Type ♂ in the collection of the American Entomological Society. Type ♀ in the author's collection. Three paratypes (♂) in the collection of the American Entomological Society. Two paratypes (♂) in the collection of U. S. Nat. Mus. Paratypes in the Amer. Mus. Nat. Hist.

EVANIELLA Bradley.

Evania Auctores, ad partem.

1905. *Evaniella* Bradley, Can. Ent., February, xxxvii, p. 63.

Type.—*Evania unicolor* Ash. [nec Say]=*Evaniella semæoda* n. sp.

The labium (Fig. 35) is narrowly oval, not concealing the ligula; the third joint of the labial palpi is ovoid, not triangular, longer than broad; the eyes are in *E. californica* (Fig. 9) extremely small, so that they do not reach much below the base of the antennæ, normally they are longer (Fig. 16); the antennæ are filiform, situated on a convexity of the forehead, or if in a slight concavity there is at least no distinct rim below.

The metapleuræ have at most a polished spot on the upper corner, often none at all; the sides of the propodeum are not peculiarly sculptured; the furcula is usually with more or less divergent short tynes, often obscured by vestiture.

The posterior legs are long, and without spines.

The wings in all species known to me are hyaline; and the veins R_4, M beyond m-cu, M_{1+2}, M_1, M_2 and m are wanting, or present only as a trace (Fig. 83).

The shape of the abdomen is more or less intermediate between Evaniini and Hyptiini. The abdomen of the female is quite or nearly round, never distinctly triangular, but in one specimen is nearly so; there is sometimes a slight production of the pygidium into a point containing the ovipositor. The abdomen of the male varies from round to narrowly oval (*E. neomexicana*).

So far there are only five species of the genus known, three from North America, one from Cuba and one from British Guiana. But it is probable that many, at least of the South and Central American, Evaniæ really belong here.

TABLE TO THE NORTH AMERICAN SPECIES OF EVANIELLA.

1. Eyes very small, scarcely reaching below the insertion of the antennæ (Fig. 9); head, face and dorsum polished and almost impunctate.
californica Ashmead.

Eyes large, reaching far below the insertion of the antennæ (Fig. 16); head, face and dorsum more or less punctured.....(3).

2. Head small, narrower than the thorax; head, face and dorsum finely punctured; inner tooth of the tarsal claw much shorter than the outer.
neomexicana Ashmead.

Head large, broader than the thorax; head, face in part, and dorsum coarsely punctured; rays of the tarsal claws nearly equal (Fig. 49).
semæoda n. sp.

Evaniella californica Ashmead.
(Fig. 9.)

1901. *Evania californica* Ashmead, Can. Ent., xxxiii, p. 302.
1905. *Evaniella californica* Bradley, Can. Ent., xxxvii, p. 64.

♂.—Brown, impubescent. Head large, broader than the thorax; face smooth, shining, with only a few irregular and scarcely impressed punctulations; a deeply impressed line extending on each side between the antennæ downward and outward in an irregular curve to the mandibles, forming a very narrow strongly mucronate clypeus; mandibles broad; antennæ inserted close together, far distant from the eyes, which are very small, oval, and placed their full length from the mandibles (Fig. 9), their base barely extending below the insertion of the antennæ; cheeks very broad, polished.

Dorsum smooth, polished, minutely sparingly punctulate; propodeum in front of the insertion of the petiole similarly sculptured, rest of the propodeum and pleuræ pitted or reticulate; metanotum situated in a transverse broad and shallow groove. Posterior coxæ smooth; metatarsus somewhat longer than the three following joints united; the claws with a single distinct ray, the inner ray being reduced to a very small tooth. Wings short, only reaching the tip of the abdomen, hyaline; veins brown; R_3 obtusely curved; R_4 wanting; M_{1+2}, M_1, m, and M_2 indistinct.

Petiole short, smooth, about one-fourth the length of the abdomen; the latter subovoid; segments 2–7 exposed, segment 2 a little wider than 3.

Hab.—California (Natoma, March 3, 1885).

Type.—Collection of the U. S. Nat. Mus., 6081 (one male).

Evaniella neomexicana Ashmead.
(Fig. 83.)

1901. *Evania neomexicana* Ashmead, Can. Ent., xxxiii, p. 302.
1905. *Evaniella neomexicana* Bradley, l. c., p. 302.

♂.—Black, the lower parts of the metapleuræ and the propodeum below the petiole red. Finely puberulent. Head small, narrower than the thorax; face shallowly, closely punctulate, the punctures somewhat confluent; antennæ approximate, inserted on a convexity of the front; a groove extending from without the antennæ downward and slightly inward to either side of the clypeus; vertex rounded, closely punctulate, not confluent; cheeks and temples very narrow and almost linear, smooth and polished, with a few scattered punctures; eyes large, oval, removed by one-third their length from the mandibles.

Dorsum with distant large round punctures; pleuræ similarly and venter more sparingly punctured; upper angles of mesopleuræ smooth, polished, impunctured; propodeum coarsely reticulate; metanotum comparatively broad in a shallow transverse, curved groove. Posterior coxæ approximate, prongs of the furcula subdivergent, the larger tibial spur more than half the length of the metatarsus, the latter nearly as long as the three following joints united; last joint nearly as long as the third; claws two-thirds as large as the fourth tarsal joint, slender; rays at acute angles, the inner (basal) ray much the shorter. Wings long, extending considerably beyond the tip of the abdomen, hyaline; the stigma dark, many of the veins more or less faint; M_{1+2}, M_1, m and the longitudinal part of M_2 visible as mere traces; R_3 obtusely angled.

Abdomen long and narrow; the petiole punctulate, two-thirds the length of the abdomen. Segments 2-7 fully exposed, the second but little wider than the third.

Hab.—New Mexico, Las Cruces, Sept. 9th (T. D. A. Cockerell).
Types.—U. S. Nat. Mus., No. 6080 (2 males).

Evaniella semæoda n. sp.
(Figs. 11, 16, 35 and 49.)

1887. ? *Hyptia dorsalis* Cresson, Cat. Hym. N. A.,1887, p. 182.
1901. *Evania unicolor* Ashmead, ad partem, Can. Ent., xxxiii, p. 304, nec Say.

♂, ♀.—Black, the thorax, petiole, scape and face sometimes more or less red. Finely pubescent. Face sparingly punctured, edge of the clypeus smooth, acute; antennæ inserted close together on a convexity of the face, more than the length of their first two joints from the ocelli; front above the antennæ coarsely, vertex very coarsely punctured; ocelli large, distant; cheeks narrow, almost as wide at the apex as at the base of the eyes; eyes large, oval, removed by about one-fourth their length from the mandibles.

Thorax coarsely and thickly punctured; punctures smaller on the sides and venter; propodeum reticulate, a polished spot on the pleuræ; parapsidal grooves wanting; metanotum not very narrow, in a slight transverse impression. Middle coxæ moderately distant, posterior ones approximate; the prongs of the furcula parallel; the posterior coxæ coarsely punctured; the longer tibial spur little less than one-half as long as the metatarsus; the latter about as long as the following three joints united; claws small, about two-thirds the length of the fourth tarsal joint, bifid; the rays about equal, at acute angles, the outer (apical) ray sometimes much less stout than the other (Fig. 49). Wings hyaline, veins R_4, M_{1+2}, M_1, M_2 and m wanting, their position indicated by a faint trace; R_2 obtusely angled.

In the male the petiole is smooth; about two-thirds the length of the broadly oval, nearly orbicular, polished abdomen; segments 2-6 inclusive fully exposed; the third about two-thirds the width of the second. In the female the slightly pitted petiole is about one-half the length of the nearly orbicular, obliquely truncate, polished abdomen; segments 2-5 inclusive fully exposed, the second making up about one-third of the exposed area, almost three times as wide as the third segment.

The color of this species is very variable. It is barely possible that two species may be included, the one of northern distribution and black in color, the other southern and with more red. The color, however, intergrades, and I can find absolutely no structural difference that will separate them. I have in all before me eight specimens, all from the United States National Museum collection. Four specimens are black entirely, except with forelegs testaceous beyond the trochanters, and two of them have some reddish on the dorsum. One specimen is mixed with reddish-brown all over the thorax and legs, and the base of the antennæ, and the apex of the

petiole white; another has the first five joints of the antennæ and the front and middle legs brown, the trochanters and apex of petiole white, and the upper part of the thorax red; another the scape, lower part of the face, and upper part of thorax red, and the front legs brownish; two others have the upper part of the thorax red, and the apex of the petiole white.

In the "Canadian Entomologist," vol. xxxiii, p. 304, Dr. Ashmead states that he has recently recognized *Evania unicolor* Say as distinct from *appendigaster*, differing in punctuation. From the labels on his specimens it is evident that he refers to the northern or black form of this species, *semœoda*, which differs very markedly from *appendigaster*, but very certainly belongs here and not to *Evania*. In the "Canadian Entomologist," vol. xxxvii, p. 64, I state in speaking of *Evaniella*, "Here also belongs and stands as type the species which Dr. Ashmead calls *unicolor* Say, but is not that species. Say's description applies to *E. appendigaster*, which could easily have spread into the interior with the early settlers, inasmuch as it is parasitic on cockroaches."

After receiving a letter from Dr. Ashmead assuring me of his conviction as to the correctness of his determination, I looked over the matter again and came to the conclusion that he was right, and so wrote to him. Inasmuch as there was doubt concerning the identification, and since the type was destroyed, it seemed to me right to follow his determination. But recently it has seemed to be so impossible to identify the specimens in question with Say's description, that I have decided to follow my former course and describe it as new, leaving Say's *unicolor* as a synonym of *appendigaster*, or as a species which has not since been collected and which may yet come to light. I follow this course with great regret, not only because I do not wish to add unneccessarily to nomenclature, but because could I conscientiously do so, I should prefer to follow the judgment of an entomologist as experienced as is Dr. Ashmead.

Say's description of *unicolor* is as follows, the italics are my own:

"Entirely black, immaculate, slightly sericeous. Inhabits the United States. Antennæ as long as the body; palpi piceous; *thorax with very few small punctures;* metathorax [propodeum] densely punctured; wings hyaline, nervures fuscous; *a distinct nervure passes from the dividing nervure of the cubital and discoidal cellules to the posterior margin of the wing;* abdomen much compressed; impunctured, polished oval, rather longer than the petiole; posterior feet elongated. Length more than three-tenths of an inch.

"The proportions of the petiole, abdomen and posterior feet of this insect are nearly the same with those of *appendigastor* Fabr. I obtained a specimen near the Rocky Mountains, and it is also found in Pennsylvania. The additional nervure is sometimes connected with the radial cellule by a faint, transverse nervure, so as to form a second cubital cellule."

In *semœoda* the thorax is coarsely and thickly punctured; in *appendigaster* it has very few small punctures. In *semœoda* the mesopleuræ have the upper half smooth, a character that would not likely have been overlooked by Say; in *appendigaster* the upper part of the mesopleuræ is only slightly less punctured than the lower part. It is characteristic of *semœoda* as well as other species of *Evaniella* that the "nervure passing from the dividing nervure of the cubital and discoidal cellules to the posterior margin of the wing" (M_{1+2} and M_1) as well as the "faint transverse nervure" connecting it with the radial cellule (R_4), "so as to form a second cubital cellule," and also m-cu and M are always and invariably atrophied (Fig. 83). In *appendigaster* and other species of *Evania* these veins are present, just as described in the description of *unicolor*, but in occasional specimens of *appendigaster* only, so far as I have observed, is R_4 present, and then always partly atrophied, so as to appear, as Say says, as a "faint transverse nervure." The proportions of the posterior feet of *semœoda* are not the same as in *appendigaster*. In *semœoda* the metatarsus is about as long as joints 2 + 3 + 4 together, in *appendigaster* only as joints 2 + 3. The joint bearing the claws is much longer in *appendigaster* than in *semœoda*.

Inasmuch as *appendigaster* was a European species, it is highly probable that Say would not have identified his specimens with it even if they agreed. He points out no difference between *unicolor* and *appendigaster*, and we have no evidence that he knew *appendigaster* from anything except description. On the other hand it is possible that *unicolor* may represent a native American species which is at present unknown to us. I have seen no specimen of *appendigaster* or *semœoda* from west of Georgia and Ohio, whereas Say described *unicolor* from the Rocky Mountains.

The red form of *semœoda* has been in collections as *Evania dorsalis* Westwood.

Hab.—Massachusetts (Woods Holl, C. T. Brues); New Jersey

(Brown's Mill Junction, June 25, 1905, E. Daecke; Jamesburg); Georgia (Tifton); Florida (Crescent City).

Type.—In the author's collection. Paratypes in the U. S. N. M.

HYPTIA Illiger.

Evania Fabricius, et al.
1807. *Hyptia* Illiger, Rossi, Fauna Etrusca, ii, p. 82.
1841. *Hyptiam* Shuckard, Entom., i, p. 120.
1889. *Evania* Schletterer, Ann. d. k. k. nath. Hofm., Wien, iv, p. 118.

Type.—*Evania petiolata* Fabricius.

The color is usually black, but may be more or less red or yellow; the anterior and often middle legs are sometimes pale or brown, but the color is variable within the species. Clothed with a white or yellowish sparse pubescence, sometimes becoming so thick on the metaventer and coxæ as to conceal the punctation. The head seen from above is transverse to transverse-quadrate, the anterior margin between the eyes appearing from such a view more or less convex, sometimes with a mesal emargination in which are placed the antennæ (Fig. 12). In profile the head varies from narrow to broad, usually widest at or below the antennæ, either flat or more or less pointed above the eyes; the latter are somewhat oblique, and the malar space is generally about one-half as long as the eyes; the mandibles are short, and have a blunt tooth within; the clypeus is pointed in the middle, sometimes set off laterally by a short indistinct groove; from the upper margin of the base of the mandibles a carina is usually present running to the base of the eye, and then upward parallel to and slightly separated from the inner margin of the eye, to varying height, separating the face from the cheeks; the clypeus and face are usually somewhat prominent or gibbous; the forehead is flat or convex, and the antennæ are not inserted in a basin, nor are there any carinæ between or around them; they are 13-jointed and are either filiform, gradually and evenly thickened (Fig. 57), or short and strongly thickened beyond the base of the flagellum (Fig. 58); these characters and the proportions of the scape to joints three and four together, and of the pedicel to joint three, I have found of specific value, although these distinctions are doubtless to a certain extent only sexual. The labium (Figs. 37 and 38) consists of a large, highly chitinized, broad, pear-shaped piece, beneath which the ligula is concealed and the palpi originate; the labial palpi are 3-jointed, the terminal joint broadened, but not

as much as the third joint; the palpiger distinct. The head behind the eyes and vertex is more or less narrowed, a carina of varying distinctness separating it from the gular regions.

The neck is short. The pronotum (Fig. 19) consists of a transverse vertical piece, constricted in the middle and usually smooth and polished; the lower edge is more or less produced forward into a short transverse collar; the humeral angles (Fig. 19) are prominent or rounded; the upper edge is emarginate in the centre, the mesonotum fitting into the emargination; the propleuræ and venter are not distinct, but small and concealed beneath the head, as is always the case in the subfamily (Fig. 19). The mesonotum and scutellum form together a more or less convex area, and are separated from each other by a transverse straight suture that is often not plain; the anterior and lateral grooves are absent, the parapsidal grooves are not present in any species in our fauna, or at least not more than a trace of them anteriorly; in West Indian and other exotic species they are distinct, but when so are usually placed a little nearer the middle than in *Evania;* the mesopleuræ have a highly polished impunctate or minutely punctulate area occupying more or less of their upper surface (Figs. 1, 6 and 7); this area is generally broken above by a circular pitted area, and has usually some irregular pits in the middle; its shape and extent, and the depth and shape of a large oblique fossa or depression traversing the forward part of it, and forming a receptacle for the femora are characters of specific importance; anterior to the depression the pleuræ are swollen into an oblique broadly rounded ridge, the punctation of which is usually sparser than on the dorsum, but similar to the venter, from which it is not separated. This area I have spoken of as the anterior swelling of the mesopleuræ. The metanotum (Fig. 63) is a very narrow transverse strip, depressed between the scutellum and propodeum, the edges of which form gradually sloping walls for it (Fig. 63). On the metapleuræ there is anteriorly a very narrow punctured area, interrupted mesally, behind which there is an oblique well marked carina, parallel to and behind this carinæ is a broad fossa of varying depth, and the nature of the reticulations in this fossa and on the propodeum just behind it is of great specific importance (Pl. V); these may be long and narrow with few or no cross bars, or nearly square, and there may be from one to three rows; one or two oblique carinæ may be present, one

on the anterior edge of the region; the other near the posterior edge; behind this area of modified reticulations the entire propodeum is hexagonally reticulate, except above the petiole, where it is punctured or otherwise sculptured.

The hind legs are much shorter than in the other genera (Fig. 61), about equalling the whole length of the insect; the coxæ have an oblique groove without, much deeper than in *Evania*. The tibiæ and sometimes the tarsi have among the pubescence rows of fine yellow spines; these are usually difficult to detect, and I have never seen any in which they are prominent, as they are in *Acanthinevania*, in which they are black and very much more abundant. *H. amazonica* Schletterer is said to have the spines distinct. The tibia is thickened a little toward the apex; the longer of the two apical spurs varies in the different species from less to more than one-half the length of the metatarsus; the latter is longer than joints 2–4 taken together, and upon how much longer depend some specific distinctions; the tarsal claw is of moderate or small size, with a single tooth within (Fig. 54), shorter than the apical ray, and at a little less than a right angle to it; the size and angle of the tooth does not seem to differ in the genus, and hence offers no character for specific distinctions.

The wings are hyaline, sometimes with a milky lustre, and there are present in the front wing (Fig. 86) only veins C, Sc + R + M, the stigma, Cu, Cu_1, and M_4; where the two latter join a short crosspiece indicates the original position of the base of m cu and $Cu_1 + M_4$. Faint lines indicate the original position of some of the now atrophied veins, arranged as in *Evania*. The hind wings have only part of the vein R + M present.

The sculpture of the petiole is a matter of prime importance; there is usually a tendency toward oblique ridging, at least along the lower part of the sides, but above it may be nearly smooth with only a few punctures, or may be finely longitudinally striate; the length of the petiole is usually about equal to that of the abdomen, or sometimes less. The abdomen is orbicular, alike in the two sexes, black, smooth and polished; the second segment extends about two-thirds its entire length, the third segment is also broad, and the remaining segments are very narrowly, when at all, exposed. The ovipositor is not exserted, nor are the claspers of the male evident, so that it is usually impossible to determine the sex without dissec-

tion. For this reason I have been frequently obliged to omit statement of the sex in the descriptions that follow. Judging from the other genera it may be inferred that those with more filiform antennæ and shorter scape are males. Some of the published descriptions have certainly erroneously stated the sex.

The largest species that I know is about the size of *Evania appendigaster*, the smallest measures 2.5 mm. *Hyptia* is the most specialized genus of Evaniinæ, except *Evanielius*, as is evident primarily from the wings, where the climax of atrophy is reached, almost all the veins having disappeared. The mouth-parts and thoracic structures show further specialization along the lines followed by *Evania*, and I think it not improbable that even the shortness of the hind legs indicates greater specialization, although in the opposite direction, than the extreme length of the same in the other genera. Further I believe the genus to be one that is undergoing active modification today, judging from the fact than in our North American species, which I have studied very carefully, it is difficult to find any two specimens which do not differ more or less in one or more characters, although perhaps to an extent that would not be noticeable to one not very familiar with the group.

Hyptia is confined to the Americas, and reaches its highest development in the tropics, where future collection may be expected to yield a very large number of new species.

TABLE TO THE NORTH AMERICAN SPECIES OF HYPTIA.

1. Flagellum distinctly thickened beyond the middle, tapering again toward the apex, giving the antennæ a distinctly clavate appearance, the joints in the thickened portion often scarcely longer than broad (Fig. 58)..(2).
   Flagellum filiform or slightly and evenly thickened, the joints distinctly longer than broad (Fig. 57).....(4).
2. Petiole more or less distinctly punctured, slightly or not at all striate ....(3).
   Petiole finely and very distinctly sublongitudinally striate.
   harpyoides n. sp. (♀).
3. Sides of the propodeum sculptured as in Fig. 8; species black.
   mylacridomanes n. sp.
   Sides of the propodeum sculptured as in Fig. 6; species usually more or less red ..... **thoracica** Blanchard (♀).
4. Scape one-quarter or less longer than segments 3 + 4.....(5).
   Scape distinctly more than one-half longer than segments 3 + 4; petiole thickly set all over with coarse punctures, between which are interrupted striæ..... **reticulata** Say (♀).
5. Punctures evenly placed on the vertex and mesonotum, about their diameter's length apart. Length 2.8 mm..... **floridana** Ashmead.
   Punctures much rougher, more closely placed. Length 6 mm. or more ...(6).

6. Sides of the propodeum with long parallel bars and narrow interstices (Figs. 2 and 3).....(11).
   Sides of the propodeum not so sculptured.....(7).
7. Sides of the propodeum with a distinct second oblique carina, between which and the first the area is depressed and the interstices lengthened, the bars parallel and often weak (Figs. 1, 4 and 7); petiole on the side with numerous deep punctures, wrinkles indistinct or none.....(9).
   Interstices on the sides of the propodeum broken up into three rows of squares (Figs. 5 and 6).....(8).
8. Scape between one-fifth and one-quarter longer than segments 3 + 4; petiole coarsely obliquely wrinkled, less distinctly above; interstices on the side of the propodeum rectangular, in three rows (Fig. 5). Black. **texana** n. sp.
   Scape less than one-fifth longer than segments 3 + 4; petiole with few irregular shallow punctures; anterior swelling of the mesopleuræ closely and coarsely punctured; color usually more or less red. **thoracica** Blanchard (♂).
9. Anterior swelling of the mesopleuræ smooth, with only a very few minute punctulations; face coarsely and roughly sculptured; the punctures on the forehead leaving between them flat polished rims; petiole punctured, without wrinkles on the sides.....(10).
   Anterior swelling of the mesopleuræ with a number of coarse punctures; face roughly but much more finely and brokenly sculptured; punctures on the forehead so close as to leave only a narrow convex opaque ridge between them; propodeum as in Fig. 7; petiole thickly set all over with coarse punctures, a few striæ toward the sides, and very fine striæ between the punctures. Black.....**reticulata** Say (♂).
10. Black; tibial spur less than one-half as long as the metatarsus; sides of the propodeum sculptured as in Fig. 4.....**nyctoides** n. sp.
    More or less red; tibial spur over three-fifths as long as the metatarsus; propodeum sculptured as in Fig. 1.....**prosetethera** n. sp.
11. Petiole roughly obliquely to longitudinally striate above and below, punctures, often coarse, among the very fine striæ; color entirely black (Fig. 3).....**harpyoides** n. sp. (♂).
    Petiole nearly smooth, with a few small punctures and short striæ on the sides below; color more or less red (Fig. 2)...**hyptiogastris** n. sp.

Hyptia harpyoides n. sp.

(Figs. 3, 12, 54, 57, 58 and 61).

1887 ? *Hyptia reticulata* Cresson, ad partem, List Hym. N. A., p, 182.

♂, ♀.—Brown; anterior legs and middle tarsi lighter, subtestaceous. Head and body clothed with yellowish hairs, especially thick on the venter and posterior coxæ, almost obscuring the furcula and sculpture of that region. Head seen from above (Fig. 12) transverse, nearly quadrate, strongly convex in front between the eyes; space behind the eyes rather small; posterior angles rounded; posterior margin truncate, reflexed. Profile rather broad, rounded above; forehead slightly convex; eye very slightly oblique; temples widened below; malar space (.43 mm.) two-third as long as the eyes (.63 mm.); cheeks incurved below, so that the base of the mandibles is scarcely visible from the side. Face from

in front a little longer than in *reticulata*, somewhat truncate below, the eyes slightly prominent; no antennal basin; mandibles deeply punctured at their base; palpi pale; clypeus not separated laterally by a groove, the cheeks separated from the face by a poorly defined carina extending from the upper angle of the base of the mandibles outward and upward to the base of the eyes, then along the inner margin of the eyes to their summit; the middle of the face with the clypeus forming a slightly gibbous area without distinct boundary; face, forehead, vertex, temples and cheeks rather more closely and coarsely punctured than in *recticulata*, appearing rather deeply reticulate than punctate; the punctures not confluent; forming rows on the temples; posterior margin of the head subcarinate; no carina between the antennæ; posterior ocelli .31 mm. apart, .19 mm. from the compound eyes; slightly behind the apex of the latter; these small, .63 mm. long, narrowly oval, somewhat pointed below, their inner margins parallel; the face wide; antennæ placed .10 mm. apart, .29 mm. from the compound eyes, below the middle of the latter; in the female (Fig. 58) much shorter and thicker than in *reticulata*, .24 mm. thick at the thickest part, which is beyond the middle; scape one-fourth as long as the flagellum; two-thirds longer than joints three and four together; pedicel equalling the first joint of the flagellum in length; antennæ of the male (Fig. 57) of equal thickness throughout; the scape one-seventh as long as the flagellum, a little shorter than joints three and four together; pedicel as long as the first joint of the flagellum.

		Scape	Ped.	3	4	5	6	7	8	9	10	11	12	13	Flag.	Total
♂	mm.	.41	.19	.20	.24	.24	.25	.24	.24	.26	.26	.26	.24	.43	2.88	3.48
♀	mm.	.60	.19	.19	.17	.17	.19	.19	.19	.24	.24	.19	.19	.38	2.35	3.14

Body short, about one-quarter narrower in proportion to its length than in *reticulata;* length 2.5 mm.; width 1.3 mm.; height 1.9 mm. Pronotum not forming a visible collar, humeral angles very short, the front of the dorsum appearing squarely truncate; mesonotum and scutellum convex, without any sign of lateral, anterior or parapsidal grooves; the whole back appearing as though without sutures; mesonotum and scutellum punctured similarly to the head; vertical part of the pronotum apparently roughened; its postero-lateral angles also roughened; the upper posterior part of the mesopleuræ occupied by an oval, moderately polished, oblique depressed area, with a few minute punctulations; the anterior swelling deeply punctate behind, roughened in front; the entire venter coarsely punctured, the sculpture largely hidden by the vestiture; propodeum very shallowly reticulate, the reticulations much lengthened and closely parallel on the sides (Fig. 3); deeper above the petiole. Middle coxæ .22 mm. apart, .60 mm. from the front, and .48 mm. from the hind coxæ; the latter .12 mm. apart; furcula short, indistinct, concealed by the vestiture, not evidently forked.

Coxæ	Troc.$_1$	Troc.$_2$	Fem.	Tib.	Tar.$_1$	Tar.$_2$	Tar.$_3$	Tar.$_4$	Tar.$_5$	Total	Tib. spur
.62	.36	.07	1.20	1.37	.84	.26	.12	.10	.08	5.00	.38 mm.

The tarsal spur is about one-half the length of the metatarsus, the latter is three-fourths longer than joints 3-4 together; claw similar to *reticulata*, rather smaller; posterior coxæ hairy beneath; trochanters nude and polished within, clothed on the outer side with short hairs; femora minutely roughened, clothed with fine hairs; tibiæ longitudinally aciculate, sparingly hairy, clavate at apex; tarsi densely covered with fine hairs; tibiæ and tarsi without spines.

The distance from the metanotum to the petiole is .48 mm., the petiole is 1.03 mm. long, the abdomen 1.32 mm. long; petiole obliquely finely and closely striate on the sides and above. Abdomen orbicular, smooth and polished, the second segment occupying three-fourths its length; segments beyond the third visible only at their extremities. Length 6 mm.

Hab.—Pennsylvania (Philadelphia, July 3, 1899; Delaware Co., July 14, 1898; Lehigh Gap, July 1, 1897, and July 13, 1900, H. L. Viereck; August 1903, J. C. Bradley); Virginia; Canada; New York (Flatbush, L. I., J. L. Zabriskie, July 28, 1893; Ithaca, July 17, 1904, R. S. Woglum; July 9, 1904, July 17, 1905, J. G. Barlow); Michigan (Gold Ledge and Constantine; Kansas (Lawrence, June 18, 1896, H. Kahl; Baldwin, June, J. C. Bridwell).

Type.— ♂, ♀, in the author's collection. Paratypes in the collections of the American Entomological Society; United States National Museum; Cornell University and Rhode Island Agricultural College. The type female shall take precedence over the type male.

The most abundant species of the genus in the north.

Hyptia mylacridomanes n. sp.

(Fig. 8.)

♀.—Black; anterior and middle legs brown. Clothed with white hairs. Head from above transverse-quadrate; the anterior edge between the eyes prominent, not evenly convex nor emarginate mesally; the space behind the eyes medium. Profile somewhat pointed above, broadest below the antennæ; eyes oblique, slightly emarginate externally; forehead flat; temples moderately narrow above, much widened below; malar space slightly less than one-half the length of the eyes. Face from in front nearly round, slightly prolonged below, eyes slightly prominent; no antennal basin; apex of mandibles red; the cheeks are separated from the face by a distinct carina, passing from the upper angle of the base of the mandibles to the eyes, then parallel to and but a short distance from the inner margins of the latter to slightly above the insertion of the antennæ; face and clypeus not gibbous; face, forehead, vertex, temples and cheeks closely, coarsely and umbilicately punctured; the punctures less distinct around the antennæ, arranged in rows on the temples; head narrowed behind the eyes; posterior edge not very sharp; no carina between the antennæ; the latter inserted below the middle of the compound eyes, plainly subclavate; scape about one-quarter as long as the flagellum, two-fifths longer than joints 3 + 4; pedicel over three-fifths as long as the first joint of the flagellum.

Body short and stout. Pronotum not forming a visible collar; humeral angles rounded off; mesonotum and scutellum strongly convex, without parapsidal, lateral or anterior grooves; a straight transverse suture between the mesotum and scutellum; vertical part of the pronotum smooth, polished and impunctate; the polished area on the mesopleuræ is irregular, extending two-thirds of the way to the coxæ, broken by a few confluent pits in the centre; the groove not very deep nor prolonged to the coxæ; the anterior swelling full, sparingly punctured with large shallow round punctures, among which are a few minute punctulations; mesoventer similarly punctured; metaventer more coarsely punctured, but the punctures obscured by the vestiture; two distinct oblique carinæ on the metapleuræ (Fig. 8), the first prominent and sharp, with a depressed broad fossa behind it; the reticulations between the two carinæ are four times as long as broad, rather regularly arranged, with a few irregular cross-pieces; behind the second carina the reticulations at the sides are square, the mesal ones elongated, forming a roughly triangular area outside of which the reticulations on the propodeum are of moderate size and depth and hexagonal in shape; above the petiole the propodeum is coarsely punctate. Middle coxæ far apart, nearer to the hind than to the front pair; furcula with very short rounded lobes.

The tarsal spur is one-half the length of the metatarsus; tibiæ minutely spined. Wings hyaline.

Petiole more or less smooth, polished, with a few punctures, these somewhat dilated and oblique on the sides, a few short oblique ridges at the base of the sides, but not appearing obliquely or longitudinally grooved or striate. Abdomen orbicular, much less compressed than is usual in the subfamily, smooth, polished. Length 7.5 mm.

This is the largest species of *Hyptia* that I have seen. It is about equal in size to a small specimen of *Evania appendigaster*.

Hab.—New York (Ithaca, J. H Comstock).

Type.—One female, in the collection of Cornell University.

Hyptia thoracica Blanchard.

(Fig. 6.)

1840. *Evania thoracica* Blanchard, Hist. Nat. Insec., iii, p. 299.
1841. *Hyptiam thoracicum* Shuckard, Entom., p. 120.
1844. *Evania thoracica* Guérin, Rev. Zool. Soc. Cuv., p. 39.
1851. *Evania dorsalis* Westwood, Trans. Ent. Soc. Lond. (2), i, p. 214 (new name for *thoracica* Blanchard).
1887. *Hyptia thoracica* Cresson, List Hymen. N. A., p. 182.

♂, ♀.—Dark red; abdomen, petiole, legs, venter and antennæ black; metapleuræ and forehead dark. Sparingly clothed with white hairs. Head seen from above transverse, the eyes rather prominent, very little space behind them, the anterior edge between them very slightly convex, the posterior margin slightly concave, reflexed. Profile irregular, narrow and pointed above, widest below the antennæ; forehead flat; eyes oblique; temples narrow above, considerably widened below; malar space (.48 mm.) one-third the length of the eye (1.44 mm.); cheeks incurved. Face from in front equilaterally triangular, with rounded basal corners; mandibles deeply punctured at their base, their tips red, .79 mm. from base to base; palpi dark; clypeus separated laterally by a short

impressed suture; cheeks separated from the face by a broad ridge, extending upward close to the inner margin of the eyes; the clypeus and face gibbous; face, forehead, vertex, temples and cheeks rather closely but shallowly umbilicately punctate, the punctures deepest on the vertex, in rows on the temples, smaller than in *prosetethetra;* the antennæ filiform in the male, distinctly clavate toward the middle of the flagellum in the female, inserted in a slight depression considerably below the middle of the eyes; no interantennal carina; scape a little less than one-fifth the length of the flagellum, one-seventh longer than joints 3+4; pedicel less than one-half as long as the third joint. Alitrunk short and stout. Pronotum straight, truncate, not incurved, nor prolonged at all into a collar; the humeral angles scarcely sharp, not prominent; mesonotum and scutellum distinctly convex; lateral and anterior grooves absent, the parapsidal grooves very faintly impressed; the polished area on the mesopleuræ not large; a distinct round pit in the centre, and a larger one at the upper corner; the groove distinct and reaching to the coxæ; the anterior swelling full and impressed with round punctures, a little smaller than those on the dorsum, numerous minute punctulations between the lower ones; the venter is similarly punctured, the metaventer a little more coarsely; the mesonotum, scutellum and propodeum above the petiole are closely, coarsely and umbilicately punctured, the punctures quite large; the propodeum below the petiole is reticulate; the sides of the propodeum and the metapleuræ are sculptured as in Fig. 6.

Petiole smooth and polished, with scattered ill defined punctures. Abdomen orbicular, smooth and polished. Length 6.5 mm.

A specimen from New Jersey is entirely black and may be distinct.

Hab.—Florida (Jacksonville, Crescent City, Biscayne Bay); Virginia; Georgia (Tifton); New Jersey (Da Costa, July 19, '03, E. Daecke).

Described specimen in the author's collection.

In 1840 Blanchard described *Evania thoracica* and his description may apply either to a true *Evania*, which is highly improbable, because we know no North American species that are red in color, to an *Evaniella* or to a *Hyptia*. In 1844 Guérin referred to Blanchard's species under the same name without attempt to change its limitation. It has been common among collectors to call all the more or less red species of *Hyptia* occurring in North America *thoracica*, and hence it seems well to determine that henceforth until Blanchard's type be rediscovered the name *thoracica* Blanchard shall apply to the red species of *Hyptia*, which I have above described under that name. In 1841 Shuckard, evidently unaware of Blanchard's work, described *Hyptiam thoracicum*, basing the form *Hyptiam* on the accusative used by Illiger in his original mention of the genus, as elsewhere detailed. By a figure of the wing

Shuckard leaves no doubt as to the generic place of his species, a true *Hyptia*. The simplest course to adopt in treating it is to establish that henceforth, until Shuckard's type be examined, it is a synonym and likewise a homonym of Blanchard's *thoracica*, and therefore has no standing. Therefore, when Shuckard's type can be examined, if it proves to be the same as the species that I have described, no further change need be made; if different, it will remain a homonym, though no longer a synonym, and a new name will have to be given it. On the ground that Blanchard's name *thoracica* had been previously used, Westwood in 1851 proposed the name *dorsalis* to replace it. But *thoracica* had not been previously used other than in manuscript, hence *dorsalis* Westwood has no standing whatsoever, except to invalidate as a homonym *dorsalis* Cameron, proposed for a Central American species and replaced by *cameroni* Schletterer. The name *dorsalis* has been used without shadow of reason by collectors for *Evaniella semœoda*.

Now further confusion arises from Schletterer who indicates the possibility of synonymy as follows: he refers *thoracica* Blanchard, *thoracica* Guérin, and *dorsalis* Westwood to the Mexican *azteka* Schletterer; *thoracica* Guérin again to the Asiatic *dimidiata* Fabr.; *thoracica* Shuckard to *ocellaria* Schletterer from Mexico and the Antilles. In every case except in the reference of *thoracica* Guérin to *dimidiata* he refers them with an interrogation mark; *dimidiata* and *thoracica* Guérin he makes definitely identical, and we would have to consider this as determining the position of the species until the type be rediscovered, were it not for the palpable absurdity of identifying it with an Asiatic species without any cause. Identification of *thoracica* Guérin with *dimidiata* Fabricius would also necessarily include *thoracica* Blanchard and *dorsalis* Westwood. So we shall have to leave Schletterer out of consideration in this case for he is very evidently in error.

Hyptia floridana Ashmead.

1901. *Hyptia floridana* Ashmead, Can. Ent., xxxiii, p. 302.
1902. *Brachygaster floridanus* Kieffer, Gen. Insec., ii, p. 5.

♀.—Dull black. Sparingly clothed with short white hairs. Head seen from above transverse, subquadrate, angles rounded, the eyes occupying almost the entire width; posterior edge truncate; anterior edge between the eyes convex, not noticeably emarginate mesally. Profile elliptical, somewhat pointed above; eyes oblique; forehead flat; temples quite narrow above, three or more times as wide below; malar space (.22 mm.) one-half as long as the eyes (.48 mm.);

cheeks considerably incurved. Face from in front round, the eyes not prominent; no antennal basin; mandibles reddish-yellow, roughened, .41 mm. from base to base; sides of the clypeus without a limiting suture; cheeks separated from the face by a distinct carina, extending from the upper angle of the base of the mandibles outward to the base of the eyes, then inward parallel to and but slightly removed from the inner margins of the eyes to just above the altitude of the insertion of the antennæ; clypeus and face not gibbous; face reticulate, the reticulation somewhat transverse; forehead and vertex with regular, not very deep punctures, evenly placed at about their diameter's length apart; temples with about two rows of punctures; cheeks with confluent punctures; head rounded behind the eyes, posterior margin not sharp, indistinctly carinate; no carinæ between the antennæ. Posterior ocelli .24 mm. apart, .07 mm. from the compound eyes, small; the latter of medium size, rather broadly ovate, widest above, the inner margins parallel, .48 mm. long. Antennæ inserted .05 mm. apart, .17 mm. from the compound eyes; the flagellum somewhat thickened beyond its base; scape three-sixteenths as long as the flagellum, one-fifth longer than joints 3 + 4, pedicel four-fifths as long as long as the first joint of the flagellum. Alitrunk short, 1.08 mm. long, .55 mm. wide, 1.01 mm. high, markedly tapering toward the propodeum. Propodeum not forming a visible collar, the humeral angles sharp; mesonotum and scutellum convex, without sign of anterior, lateral or parapsidal grooves, a distinct transverse suture between the mesonotum and the scutellum; entire dorsum punctured like the vertex; a large rhomboidal, highly polished, impunctate area occupies the entire mesopleuræ, traversed mesally by an oblique broad fossa, in front of which it is considerably swollen; the venter is much narrowed; a suture on the posterior margin of the polished area separates the mesopleuræ from the metapleuræ; the latter separated from the propodeum by a distinct carina, behind which is an oblique depressed smooth polished area, with a few elongated reticulations anteriorly and posteriorly; behind these is a second carina with a smooth area behind it; the metapleuræ are coarsely covered below with a few large very shallow round punctures; the propodeum laterally and posteriorly is very shallowly reticulate. Middle coxæ about .31 mm. from the front and .12 mm. from the hind coxæ.

The tibial spur is one-half the length of the metatarsus; the latter is three-fifths longer than joints 2-4 together; the claw is very small, with a tooth within about as in *reticulata;* tibiæ and tarsi without spines.

The distance from the metanotum to the point of insertion of the petiole is .24 mm., the petiole is .53 mm. long, longitudinally carinulate; the abdomen is round, smooth, polished; the second segment large, taking up three-fourths of its entire length; the apical segments are somewhat exposed. Length 2.8 mm.

This is the smallest species of Evaniid that I have seen, although several recently described species are slightly smaller. It is quite distinct from all the other species in our fauna, and seems more closely related with the Neotropical than the Nearctic species. Dr. Ashmead erroneously states that the types are males.

Hab.—Florida (Biscayne Bay and Jacksonville).

Types.—(Two females), U. S. Nat. Mus., Catalogue No. 6078.

Hyptia reticulata Say.

(Fig. 7.)

1835. *Brachygaster reticulata* Say, Bost. Journ. Nat. Hist., i, p. 224.
1887 ? *Hyptia reticulata* Cresson, List, Hymen. N. A., p. 182.
1887 ? *Hyptia soror* Schletterer, Ann. k. k. nath. Hofm., Wien, iv, p. 330.

♂, ♀.—Black; anterior tibiæ testaceous. Head and body clothed with comparatively long white hairs. Head seen from above transverse-quadrate; the space behind the eyes medium, not inflated laterally; the posterior angles slightly rounded; the anterior edge between the eyes convex, emarginate mesally. Profile narrowed in front above the eye, widest at the antennæ; eye slightly oblique; forehead slightly convex, almost flat; temples moderately narrow above, more than twice as wide at the base of the eyes; malar space (.48 mm.) one-half as long as the eyes (.96 mm.); cheeks incurved so that the base of the mandibles is not visible from the profile. Face from in front almost round; no antennal basin; mandibles deeply punctured at base, their mesal portion red; .77 mm. from base to base; palpi pale; clypeus produced mesally into a round point, the lateral angles rounded; separated laterally by a short poorly defined suture; the cheeks are separated from the face by a distinct carina extending from the upper angle of the base of the mandibles outward to the base of the eyes, then inward parallel to and but slightly separated from the inner margin of the eye to just above the altitude of the insertion of the antennæ; the middle of the face and the clypeus form a gibbous area bounded by the lateral grooves of the clypeus; face, forehead, vertex, temples and cheeks coarsely, closely and umbilicately punctured, the punctures rarely confluent, smaller around the base of the antennæ, coarsest on the temples and vertex; posterior margin of the head sharp, subcarinate; no carinæ between the antennæ; posterior ocelli .31 mm. apart, .12 mm. from the compound eyes, slightly below the middle of the latter; antennæ thickened mesally; scape one-quarter as long as the flagellum, one-half longer than joints 3+4; pedicel two-fifths as long as the first joint of the flagellum. Alitrunk short and stout; length 2.5 mm.; width 1.9 mm.; height 2.2 mm. Pronotum not forming a visible collar; humeral angles sharp; mesonotum and scutellum strongly convex, without any sign of anterior, lateral, or parapsidal grooves; an indistinct transverse suture between the mesonotum and scutellum; these closely, coarsely and umbilicately punctured, the punctures not confluent; vertical part of the pronotum impunctate, polished, a few transverse wrinkles on its postero-lateral edges, in front of the tegulæ; the upper part of the mesopleuræ is a large, highly polished, impunctured, depressed, rhomboidal area, with a few irregular punctures and grooves in the centre, ending below in an oblique depression, beyond which the mesopleuræ are distinctly swollen in an oblique direction toward the coxæ, this swelling and the mesoventer sprinkled with a few smaller round punctures, between which are a considerable number of minute punctulations; metaventer coarsely, closely and umbilicately punctate; propodeum shallowly reticulate, the reticulations lengthened on the side (Fig. 7); above the petiole the propodeum is coarsely punctate. Middle coxæ .19 mm. apart, .84 mm. from the front and .96 mm. from the hind coxæ, the latter .24 mm. apart; furcula short, the prongs consisting of mere rounded knobs.

The tarsal spur is one-half the length of the metatarsus, the latter is one-third longer than joints 2–4 united; the claws are of moderate size, slender, incurved,

with a blunt tooth beneath considerably shorter than the apical ray; the posterior coxæ are sparingly pitted beneath, less noticeably so above; a ring at the base is smooth and polished; the femora are polished posteriorly; finely roughened above; the tibiæ roughened, rather thickly clothed with silky hairs, among which are a number of minute stouter spines, as also on the tarsi. The wings are hyaline, somewhat milky.

The distance from the metanotum to the insertion of the petiole is .72 mm., the petiole is 1.44 mm. long; the abdomen 1.7 mm.; petiole coarsely punctured above, the ventro-lateral angles ridged, the under surface smooth. Abdomen smooth, polished; the second segment much the largest. Length 6.5 mm.

Hab.—New Jersey (Clementon, June 25, 1899, ♀, collected and presented to the author by Mr. H. L. Viereck); Ohio (♂, Sandusky, Cedar Point, July 2, 1903).

Hyptia nyctoides n. sp.

(Fig. 4.)

Entirely coal-black. Clothed with white hairs. Head seen from above distinctly transverse-quadrate, the eyes rather prominent; the anterior margin not convex or mesally emarginate. Profile rounded above, eyes high, slightly oblique; temples broadened below; mular space one-fourth the length of the eye. Face from in front almost round, eyes not prominent, no antennal basin or interantennal carina; extreme apex of mandibles red, the rest black; only a quite indistinct carina separating the face from the cheeks; face and clypeus scarcely swollen; forehead, vertex, temples and cheeks closely, not very coarsely, evenly punctured, the punctures in rows on the temples; the face roughly but rather shallowly reticulate-punctured; the compound eyes small, the antennæ inserted below their middle, nearly filiform; scape one-sixth as long as the flagellum, less than one-fifth longer than joints 3 + 4; pedicel four-fifths as long as the third joint. Alitrunk short and stout; pronotum scarcely prolonged, slightly transversely incurved; humeral angles sharp; mesonotum and scutellum distinctly convex; punctuations on them smooth, close, a little coarser than on the forehead; those on the propodeum above the petiole close, numerous and smooth, but only about one-half the diameter of those on the dorsum proper; the lateral, anterior and parapsidal grooves wanting; the whole mesopleuræ smooth and highly polished, two or three pits in a longitudinal row across the centre; the venter with numerous coarser punctures, coarsest on the metaventer; the sculpture of the metapleuræ and sides of the propodeum as shown in Fig. 4; the propodeum posteriorly and below the petiole shallowly, not very coarsely reticulate.

The tibial spur is one-half the length of the metatarsus; the latter is one-fifth longer than joints 2-5 together; the tibiæ are minutely spinulose. The wings are hyaline.

The petiole is closely, moderately coarsely punctured. The abdomen is orbicular and polished. Length 5.5 mm.

Hab.—New Jersey (Farmingdale, July 14, 1899, H. L. Viereck).
Type.—In the author's collection (one specimen).

Hyptia prosetethetra n. sp.

(Fig. 1.)

Black, except the prothorax, mesonotum, scutellum and most of the mesopleuræ red. Clothed with white hairs. Head seen from above transverso-quadrate; the anterior edge slightly emarginate; posterior corners rounded; the eyes slightly prominent. Profile rounded above; eyes oblique; temples narrow above, considerably broader below; malar space less than one-third the length of the eye. Face from in front ovate, almost round, more pointed below; eyes not prominent; no antennal basin or interantennal carina; apex of mandibles red, their base black; the cheeks are separated from the face only by an indistinct carina, extending but a short distance along the margin of the eye; face and clypeus not swollen; face, forehead, vertex, temples and cheeks closely, coarsely and umbilicately punctured, the punctures coarser and more distinct than in *H. hyptiogastris;* even and smooth on the forehead, vertex and temples, rough on the face; arranged in two or three rows on the temples; the antennæ inserted below the middle of the compound eyes; filiform; scape a little less than one-fifth as long as the flagellum; one-fifth longer than joints 3 + 4; pedicel three-fifths as long as the third joint. Alitrunk short and stout. Pronotum slightly prolonged into a collar, transversely incurved mesally; humeral angles rather sharp; mesonotum and scutellum strongly convex; lateral and anterior grooves absent; the parapsidal grooves absent, except for a slight impression near the anterior margin; the polished area on the mesopleuræ is large, with two small pits on the posterior part and one larger one above; the groove is long and deep, extending to the coxæ; the anterior swelling full, with a few quite small punctures; the mesoventer also with small punctures; the metaventer more coarsely punctured; the mesonotum and scutellum closely, coarsely and umbilicately punctured, the punctures large, smaller on the propodeum above the petiole, reticulate below the petiole. The sculpture of the metapleuræ and sides of the propodeum is as shown in Fig. 1; furcula with only very short lobes.

The tibiæ are minutely spinulose. The wings are hyaline.

The petiole is punctured on the side, a very narrow smooth stripe above. The abdomen is orbicular and polished. Length 6.5 mm.

Hab.—Tifton, Georgia.

Type.—In the U. S. National Museum. A specimen without locality in the collection of the American Entomological Society.

Hyptia hyptiogastris n. sp.

(Fig. 2.)

Black; the face below the antennæ, the dorsum and the upper part of the pleuræ red; front legs brown. Clothed with white hairs. Head seen from above strongly transverse; the anterior margin neither noticeably prominent nor mesally emarginate. Profile rather broad, rounded above; eyes nearly straight; forehead flat; temples not much widened below; malar space not one-half the length of the eyes. Face from in front oval, a little pointed below; eyes slightly prominent; no antennal basin; apex of mandibles red, their base black; the cheeks are separated from the face by an indistinct carina, passing from the upper angle of the base of the mandibles to the eyes, then within and close to

their inner margin to the altitude of the antennæ; face and clypeus somewhat swollen into a tubercle in the middle; face, forehead, vertex, temples and cheeks closely, coarsely and umbilicately punctured, the punctures more even and smooth on the forehead, vertex and temples, arranged in rows on the latter; no carinæ between the antennæ; these inserted below the middle of the compound eyes; filiform; scape a little under one-fifth as long as the flagellum; a little under one-sixth longer than joints 3 + 4; pedicel three-fifths as long as thethird joint. Alitrunk short and stout, tapering posteriorly; pronotum not forming a distinct collar; humeral angles rather sharp; mesonotum and scutellum somewhat convex; with indistinct parapsidal and no anterior or lateral grooves; vertical part of the pronotum smooth, polished, impunctate; the polished area on the mesopleuræ large, shading below into a punctured area; the groove for the reception of the legs rather deep and prolonged; the anterior swelling and the entire venter and the coxæ are thickly covered with large, sometimes confluent punctures, among which are numerous minute shallow punctulations; the sculpture of the mesopleuræ and forward part of the propodeum is as shown in Fig. 2; entire dorsum to the petiole coarsely evenly punctured, propodeum below the petiole shallowly reticulate; middle coxæ moderately far apart; furcula consisting of two short tubercles.

The tibiæ are minutely spinulose. The wings are hyaline.

Petiole smooth and polished on the very top, obliquely wrinkled and striate on the sides. Abdomen orbicular, smooth, polished. Length 6.5 mm.

Hab.—Georgia (Tifton).

Type.—In the United States National Museum.

Hyptia texana n. sp.

(Fig. 5.)

♀.—Black; the four anterior legs beyond the coxæ testaceous. Head and entire dorsum closely, coarsely, umbilicately punctured, the face less coarsely and more shallowly. Antennæ filiform, the scape a little over one-fifth longer than joints 3 + 4; pedicel four-fifteenths the length of the scape, over one-half the length of joint 3; joints 3 and 4 equal. Humeral angles rather sharp; mesopleuræ smooth and polished, the anterior swelling punctured; lateral area of the propodeum consisting of three rows of oblong interstices (Fig. 28). Posterior tibial spur one-third the length of the metatarsus; the latter longer than the remaining joints together; claw with a small tooth within. Petiole obliquely coarsely wrinkled, above less distinctly wrinkly-punctate.

Hab.—Texas (Galveston, May, F. H. Snow, 1 specimen).

Type.—In the collection of the University of Kansas.

Hyptia brevicalcar Kieffer.

1904. *Hyptia brevicalcar* Kieffer, Ark. f. Zool., i, p. 541.

"♂. L. 6 mm. Schwarz. Mandibeln braun. Gesicht schwach behaart, und sowie die Stirne und der Scheitel netzartig punktiert; letztere unbehaart; Schläfen nach unten erweitert, mit einigen sehr groben Längsrunzeln, dazwischen grob punktiert; Wangen halb so lang wie der schaft, grob punktiert, vom Gesicht durch eine tiefe und breite sich am inneren Augenrande noch fortsetzende Furche getrennt; zwei sehr feine nach aussen bogig gekrümmte Furchen reichen von den Antennen bis zum Munde und begrenzen einen elliptischen

gewölbten Raum; Stirne fast flach, kaum eingedrückt. Fühler dunkelbraun, kaum vor der Augenmitte inseriert; vor ihnen keine wallartige Erhebung; Schaft so lang wie die 3 folgenden Glieder mitsammen; 2. Glied die Hälfte des 3. wenig überragend; dieses fast doppelt so lang als dick, nur wenig länger als das 4. Thorax oberseits mit groben, sich berührenden und benabelten Punkten; Tegulæ gelb; Parapsidenfurchen fehlend; Propleuren gerunzelt; Mesopleuren in der oberen hinteren Hälfte glänzend glatt, vorne und unten grob punktiert; Metapleuren und hinterer senkrecht abfallender Teil des Metanotums grob netzartig gerunzelt; Metasternalfortsatz kurz, ungegabelt, nur ausgerandet. Flügel glashell; Medialader vorhanden; Hinterflügel mit einer Subcostalader und 4 Frenalhäckchen. Beine dunkelbraun, die vorderen rotbraun; hintere Hüften punktiert und behaart, von den mittleren um ihre ganze Länge entfernt; längerer Sporn der hinteren Tibien nur ein Drittel des metatarsus erreichend; dieser so lang wie die 4 folgenden Glieder mitsammen. Abdomenstiel rotbraun, walzenrund, doppelt so lang wie sein Abstand vom Vorderrande des Metanotums, oberseits glatt, mit einigen Punktem, seitlich schräg gefurcht. Wisconsin."

I am unable to determine the relation of this species to our other American species from the above description, and have omitted it from the key.

THE EXOTIC EVANIINÆ.

TABLE TO THE GENERA OF EVANIINÆ.

1. Abdomen of the female distinctly triangular, the apex produced into a short process from which issues the ovipositor (Fig. 18); abdomen of the male more or less narrowly oval; antennæ inserted in a single distinctly impressed basin, bordered usually at least on the lower side by a carina; usually an interantennal carina present; metanotum as seen from the side more or less deeply depressed, the sides of the depression abrupt (Fig. 62), (Tribe EVANIINI) .....(2).

   Abdomen of the female nearly circular (rarely somewhat triangular), the apex not produced into a process (or rarely slightly produced); abdomen of the male the same shape as that of the female (sometimes oval in *Evaniella*); antennæ not inserted in a distinct impressed basin, at least without any carina below or beside them, rarely if ever between them, the front usually distinctly convex; metanotum as seen from the side less deeply depressed, the sides sloping gradually (Fig. 63), (Tribe HYPTIINI) .....(5).

2. Front wings with the cell R + 1st R_1 and M_4 not coalescent, M_{3+4} and r-m usually not interstitial, but strongly arcuate (Figs. 75–79) .....(3).

   [Cells R + 1st R_1 and M_4 coalescent; M_{3+4} and r-m interstitial, forming a nearly straight line (Fig. 82).....**Evaniscus** Szepligeti.*]

3. Posterior tibiæ and tarsi provided with very distinct stout spines, arranged rather regularly over their surface.....(4).

   Posterior tibiæ and tarsi without any spines (Fig. 60); labium modified into a highly chitinized pear-shaped plate, which nearly covers and conceals the ligula (Figs. 28 and 29).....**Evania** Fabricius.

* I have not seen this genus, but believe that it belongs in the Hyptiini rather than here.

4. Labium modified into a highly chitinized pear-shaped plate, which nearly covers and conceals the ligula. Hab.—Hawaii.

Szepligetella n. gen.

Labium consisting of a much narrower less chitinized oval plate, longitudinally divided in the middle; the ligula much longer and not concealed (Fig. 26). Hab.—Austro-Malayan and Australian subregions of the Australian..... **Acanthinevania** n. gen.

5. Forewings with only one or two completely enclosed cells.....(8).

Forewings with six or seven completely closed cells ....(6).

6. Forewings with seven completely closed cells, the base of the free part of M arising from the radius near the stigma (Fig. 83).

Evaniella Bradley.

Forewings with only six completely closed cells (Figs. 81 and 82), or if with seven, then the base of the free part of M arising from the radius far before the stigma (Fig. 80) .....(7).

7. Base of the free part of M between m-cu and R wanting, or indistinct and arising from R far anterior to the stigma (Figs. 80 and 81).

Zenxevania Kieffer.

Base of the free part of M present between m-cu and R, wanting between m-cu and r-m, so that cells R + 1st R_1 and M are coalesced (Fig. 82).

Evaniscus Szepligeti.

8. Forewings with only the cells C and M present and distinctly closed (Figs. 84 and 85) .....(9).

Forewings with only cell C present and closed (Figs. 86 and 87) .....(10).

9. Flagellum of the female suddenly clavate from about the middle (Fig. 55); mesopleuræ with a distinctly polished impunctate area; claws with the inner ray much larger and stouter than the outer ray (Fig. 51).

Semæomyia n. gen.

Flagellum of the female evenly thickened from base to apex; mesopleuræ without any polished impunctate area; claws with the outer ray much the larger and more prominent (Fig. 53).

Semæodogaster Bradley (= *Brachygaster* preoc.).

10. Cubitus present in the front wings (Fig. 86); hind legs always much shorter than in any other genus of the subfamily that I have seen (Fig. 61).

Hyptia Illiger.

Cubitus absent, so that there are only two veins present in the front wings, C and Sc + R + M (Fig. 87)..... ....**Evaniellus** Enderlein.

EVANIA Fabr.

Type.—Evania appendigaster Linn.

For the description of this genus see the first part of this paper. There are 63 species of which 35 come from the Neotropical region. The species of the Palearctic region are well tabulated by Szepligeti.* He includes *chinensis*, however, in his Oriental region.

E. appendigaster will not be included in any of the tables except

* Annales Musei Nationalis Hungarici, i, p. 379, 1903.

the following, although it has become naturalized in every region. The student should become familiar with it before using any of the other keys. Probably the majority of the Neotropical species really belong to *Evaniella*.

TABLE TO THE SPECIES OF EVANIA OF THE PALEARCTIC REGION.

1. European and Mediterranean subregions ..... (2).
   Manchurian subregion ..... (9).
2. Face and cheeks longitudinally and obliquely striate ..... (6).
   Face and cheeks not striate, but wrinkled, punctate or smooth ..... (3).
3. Scutellum flat, undivided ..... (4).
   Scutellum convex, emarginate and therefore two lobed; face and mesonotum punctured; forehead depressed.† ..... **schletterери** Kohl.
4. Forehead excavated ..... (5).
   Forehead flat; face and mesonotum smooth, polished, with a few very fine scattered punctures. Black ..... **appendigaster** Linn.
5. Face with distinct scattered punctures; mesonotum with numerous sharp punctures. The petiole and more or less of the thorax red.
   dimidiata Spinola
   Face without distinct punctures. Thorax and abdomen black.
   coxalis Kieffer.
6. Antennæ inserted equidistant from the anterior margin and the middle of the eyes ..... (7).
   Antennæ inserted near the middle of the eyes ..... **flabellata** Kieffer.
7. Head, at least the face, white tomentose; front excavated; temples wrinkled and punctate ..... (8).
   Head smooth and polished; front convex, except for a small depression behind the antenna, traversed by a longitudinal carina; temples smooth.
   striaticeps Kieffer.
8. Hind wings with eleven frenal hooks; face, vertex and cheeks nearly smooth; propodeum and pleuræ weakly tomentose ..... **punctata** Brulle.
   Hind wings with eight frenal hooks; face, vertex and cheeks as thickly tomentose as the forehead ..... **incerta** Kieffer.
9. Face finely and thickly punctured ..... **chinensis** Szepligeti.

Evania dimidiata Spinola.

Szepligeti has properly credited this species to Spinola. The reference of it in Schletterer and in Dalle Torre's "Catalogus Hymenopterorum" to Fabricius, Syst. Piez., p. 179, 1804, is a pure mistake. Fabricius does not mention the name, and Spinola describes it as a new species.

TABLE TO THE SPECIES OF EVANIA OF THE ETHIOPIAN REGION.

1. Wings brown ..... (2).
   Wings hyaline ..... (3).

* Face and mesonotum coarsely wrinkled, and forehead flat in *cribrata* Semenov), said to be synonymous with *schlettereri*.

Forehead, face and cheeks exceptionally deeply, longitudinally channeled. Length 5.5 mm..... **villosa** Enderlein, Kamerun.

Forehead weakly punctured, face and cheeks smooth. Length 10–11 mm. **fumipennis** Enderlein, Kamerun.

Forehead, face and cheeks apparently wrinkly longitudinally striate, but obscured by the thick pubescence. Length 6 mm. **nyassica** Enderlein, German East Africa.

3. Furcula with parallel tynes or undivided..... (4).

Furcula with strongly diverging tynes; mesonotum rather finely and densely punctate. Length 3.5 mm..... **pusilla** Schletterer, Gold Coast.

4. Habitat, Madagascar. Black, base of flagellum and legs more or less pale. **animensis** Spinola, Madagascar.

Habitat, Cape of Good Hope..... (5).

5. Face, forehead and vertex smooth, polished and impunctate. Black. Length 5 mm..... **capensis** Schletterer, Cape of Good Hope.

Face with fine scattered punctures; forehead finely shagreened above the antennæ. Black, the base of the antennæ and the front legs yellow, apex of the petiole white. Length 3 mm. **levigena** Kieffer, Kaffraria.

TABLE TO THE SPECIES OF EVANIA OF THE ORIENTAL REGION, INCLUDING LOMBOK.

1. Hindostan, Ceylonese and Indo-Chinese subregions..... (2).

Malayan subregion..... (7).

2. Furcula diverging..... (5).

Furcula with parallel tynes..... (3).

3. Wings hyaline; petiole aciculate or smooth; Length 4 mm. or less..... (4).

Wings smoky; face with a distinct mesal keel; petiole rather coarsely obliquely wrinkled. Color black. Length 8–9 mm. **antennalis** Westwood, India and Ceylon.

4. Face and cheeks very finely longitudinally to obliquely striate, and with a scarcely perceptible mesal longitudinal keel; mesonotum shining and smooth, scarcely perceptibly punctured; petiole longitudinally aciculate. More or less rufous..... **dolichopus** Schletterer, Ceylon.

Face and cheeks more coarsely obliquely to longitudinally striate; a distinct mesal longitudinal carina; mesonotum thickly punctured; petiole smooth and polished..... **erythrosoma** Schletterer, Ceylon.

5. Thorax black. Face without distinct keels..... (6).

Thorax black; face and cheeks strongly longitudinally striate; mesonotum rugose-punctured; petiole smooth and polished, with a few shallow punctures anteriorly. Black; the base of the flagellum, of the petiole, the four anterior legs, apex of the posterior coxæ, the trochanters and the basal fourth of the femora brownish-yellow; wings clear grayish-brown..... **solox** Enderlein, Lower Burma.

Thorax red; base of the flagellum white; face with a keel on each side below the eyes. Length 6–7 mm. **curvicarinata** Cameron, Khasia Hills, India.

6. Legs marked with white.....**albitarsis** Cameron, Khasia Hills, India.
   Legs not marked with white. Color black, except the four anterior legs are brown, the petiole and propodeum posteriorly pale. Length 3-3.5 mm..... **brachystylus** Schletter, Ceylon.
7. Face striate..... .....(8).
   Face not striate.....(14).
8. Abdomen black or brown. Length about 6 mm..... .(10).
   Abdomen reddish-yellow. Length 8 mm.....(9).
9. Face strongly striate; ocelli as far from each other as from the compound eyes; petiole wrinkled. Color black...**pubipennis** Szepligeti, Lombok.
   Face finely striate; ocelli farther from the compound eyes than from each other; petiole scarcely wrinkled. Color yellowish-red.
   pulchra Szepligeti, Lombok.
10. Habitat, Java .....11.
    Habitat, Singapore or the Phillipines. Length 4.5 mm. or less. Posterior tibiæ with a yellow or white ring; first three to five joints of the antennæ red; forehead punctured or with a finely striate area on each side and a smooth space between .....(13).
11. Dorsum reticulate; length 6 mm.; forehead strongly striate or with two striæ on each side and one in the middle, the rest interrupted by a smooth spot above each antenna. Entirely black, except the four anterior tibiæ and tarsi are brown, joints 2, 3 and sometimes 4 are yellowish-white, and the base of the posterior tibiæ may be white...(12).
    Dorsum rather coarsely and thickly punctured; length 4.5 mm.; forehead smooth and polished, except for five carinæ. Rust-red, except the head above, antennæ beyond the fourth joint, posterior legs except the coxæ, trochanters and base of the tibiæ are black; the face and cheeks, apical half of the petiole and the abdomen are dark brown; antennal joints 2-4, base of the posterior tibiæ and basal half of the petiole yellowish-white.....**multicolor** Kieffer, Java.
12. Forehead with two strong carinæ on each side close to the eye, and another in the middle, the rest interrupted below the middle by a smooth area above each antenna. Base of the posterior tibiæ not ringed with white; antennal joints 2, 3 and 4 dirty yellowish in the female.
    enderleini n. sp., Java.
    Forehead, face and cheeks finely striate, the middle carina more prominent than the others. Tibiæ at base and joints 2 and 3 of the antennæ white.....**annulata** Taschenberg, Java.
13. Forehead coarsely punctured; length 4.5 mm. Broad band at the base of the hind tibiæ, and the tibial spurs yellowish-white; first five segments of the antennæ honey-yellow.
    annulipes Ashmead, Phillipines.
    Forehead on both sides finely striated, in the middle a fine keel, and the space between smooth; length 2.2 mm. Ring at base of the hind tibiæ and the first three antennal segments only, yellowish-red.
    szepligetii n. nom. (= *parva* Szepligeti, nom. preoc.), Singapore.
14. Face and forehead thickly pubescent, apparently without sculpture. Head, antennæ and legs yellowish-red.
    lombokiensis Szepligeti, Lombok.

Face weakly swollen, smooth and polished, in the middle a small tubercle. Yellowish-red; the head, antennæ, hind legs, abdomen and petiole, except the apex, black; first two and half of the third joint of the flagellum, apex of the petiole, trochanters and base of the tibiæ white; anterior and middle legs except the coxæ and trochanters brownish.

kriegeriana Enderlein, West Borneo.

Evania szepligetii n. nom.

1903. *Evania parva* Szepligeti, Ann. Mus. Nat. Hungarici, vol. i, page 381, is preoccupied by *Evania parva* Enderlein, Archiv. für Naturg., 1901, p. 193.

Evania enderleini n. sp.

(Fig. 59, 65 and 78.)

♂, ♀.—Entirely black, except the four anterior tibiæ and tarsi are brown, and segments 2, 3 and 4 of the antennæ of the ♀ are dirty yellowish-white. Head seen from above transverse; eyes very prominent and with but little space behind them, the occiput being almost wanting; posterior ocelli equally far from each other and from the compound eyes. Profile with the compound eyes projecting above the vertex and very small, scarcely extending below the level of the antennæ, so that the malar space is about equal to the length of the eyes. The clypeus and face are very convex; about six carinæ on each side of the face, converging towards the apex of the clypeus, and about double their own length apart; a more strongly marked carina in the centre; about five carinæ on the cheeks extending from the base of the eyes to the mandibles; the temples above the base of the eyes and the vertex behind the ocelli are coarsely subreticulate. The forehead has a strong mesal carina, and two carinæ on each side parallel to the inner margin of the eyes, the remaining carinæ are interrupted below the ocelli by a depressed smooth area above each antenna; this area, while appearing smooth, is really slightly shagreened. In the male the sculpture of the head is much obscured by a dense whitish vestiture, which is present on the head, thorax and propodeum much more strongly than in the female, giving a decided silvery sheen; in the female the scape is very long (Fig. 59), a little less than one-half as long as the flagellum; at the end of the scape the antennæ are strongly elbowed, and the flagellum is thickened and strongly recurved at joints 5-7; joint 3 is about the length of joints 4 + 5, which are about equal in length to each other, and of the flagellum only the first joint is twice as long as broad; in the male the antennæ are not elbowed or recurved, entirely filiform, much longer than in the female; the scape about the length of joints 2 + 3; the latter about the length of joint 4 or 5, which are subequal, and all the joints of the flagellum are at least twice as long as broad.

Entire thorax and propodeum very coarsely reticulate, except the upper part of the mesopleuræ are smooth and polished, and the entire venter is more shallowly and less coarsely reticulate; the humeral angles are square; mesonotal grooves lacking; the furcula has divergent but blunt and not very long tynes (Fig. 65).

The wings are hyaline (Fig. 78); the veins M beyond m-cu, M_{1+2}, m and the longitudinal part of M_2 are very faint. The posterior coxæ, femora and tibiæ are coarsely punctured and hairy; the tarsal claw is very peculiar, in that it is bifid and the inner ray much stronger and longer than the outer ray, and thrown

somewhat out of plane with it; both are strongly incurved; the claw of the male is smaller; the longer tibial spur is a little less than one-half as long as the metatarsus, this is as long as the remaining joints together; a few minute spines on the tibiæ, difficult of detection.

Petiole on the sides obliquely coarsely wrinkled; above coarsely punctured; a little longer than the distance from its base to the metanotum. Abdomen of the female subtriangular, the pygidium produced into a point in which the ovipositor is concealed.

Hab.—Java, 3 males, 3 females.

Type.—Male and female in the collection of Cornell University.

The type female shall take precedence over the type male as type of the species.

TABLE TO THE SPECIES OF EVANIA OF THE NEOTROPICAL REGION.

1. Argentinian and Brazilean subregions.....(2).
   Central American subregion.....(29).
2. Antennæ filiform or gradually thickened.....(3).
   Antennæ incrassate beyond the fifth joint; head and thorax reticulate-rugose. Black; mesonotum and legs red. Length 7 mm.
   paraensis Spinola, Brazil.
3. Furcula with more or less distinct tynes.....(4).
   Furcula truncate, without distinct tynes; head smooth, very finely striate in front; dorsum smooth, polished. Red; scape and femora darker; abdomen brownish-red. Length 6 mm.
   rufa Taschenberg, Argentine Republic.
4. Furcula with divergent tynes.....(5).
   Furcula with parallel tynes.....(11).
5. Petiole smooth and polished.....(6).
   Petiole rugose or striate.....(7).
6. Forehead wrinkled; face very finely punctured; cheeks entirely smooth; vertex with shallow punctures. Black; face and cheeks yellow; the upper half of the thorax red; antennæ beneath and the four anterior legs yellowish-red; base of the posterior trochanters white. Length 6 mm.....**rufidorsum** Szepligeti, Brazil.
   Forehead in the middle and above the antennæ finely rugulose, toward the antennæ and the eyes subcoarsely punctured; a distinct median carina; face longitudinally carinulate, shining, toward the antennæ finely longitudinally striate; cheeks polished with very fine punctures; vertex moderately densely punctate. Black; middle of the antennæ and the legs more or less white. Length 7.5 mm.
   signata Schletterer, Colombia.
7. Face not striate.....(8).
   Face with a few indistinct striæ; two arcuate carina running from the base of the antennæ to the mandibles; cheeks and temples smooth, polished, with a few scattered punctures; forehead with scattered rather coarse punctures, among which fine punctures are thickly set; mesonotum polished, with thickly set microscopic punctures; petiole coarsely, rugosely punctured. Length 7 mm.....**brevigena** Kieffer, Brazil.

8. Face finely punctured; cheeks and forehead sometimes wrinkled.....(9).
Head coarsely punctured. Ferruginous; head, antennæ, abdomen and posterior legs black, other legs brown. Length 10.5 mm.
nobilis Westwood, Brazil.

9. Mesonotum not rugose; petiole one and one-half times as long as the distance from its origin to the scutellum .....(10).
Mesonotum rugose or rugose-punctured.....(9*a*).

9*a*. Mesonotum weakly shining, thickly and finely rugose-punctured, also with large irregular shallow punctures; face weakly swollen, polished, very finely, shallowly and thickly punctured; forehead and vertex thickly but rather finely and deeply rugose-punctured. Yellowish-red; apex of the antennæ, abdomen and hind legs, except the coxæ, black. Length 9 mm.....**minimcei** Enderlein, Peru.
Mesonotum strongly rugose; petiole twice as long as the distance from its origin to the scutellum; head with thick but not deep punctures; cheeks with a few punctures. Black; the head and antennæ except the last four segments and the apex of the ninth orange-yellow; tarsi of all legs and tibiæ of the forelegs brown. Length 6 mm.
hænschi Enderlein, Ecuador.

10. Cheeks, forehead and vertex wrinkled; mesonotum with punctures confluent mesally; petiole one and one-half times as long as the distance of its origin from the scutellum. Yellowish-red; the abdomen and apex of the antennæ black; posterior tibiæ and tarsi brown. Length 8 mm.
pulcherrima Szepligeti, Brazil.
Head smooth and polished; forehead and vertex not wrinkled, but very finely punctured; face with microscopic scattered punctures; shoulders strongly right angled; mesonotum smooth, polished, with only minute punctures; petiole finely longitudinally striate. Length 4.5 mm.....**longitarsis** Kieffer, Brazil.

11. Propodeum with a smooth polished area around the petiole.....(12).
Propodeum reticulate around the petiole, except sometimes above it....(13).

12. Entire head and dorsum smooth and polished; petiole rugosely punctured. Length 5 mm.....**polita** Schletterer, South America.
Face smooth and polished in front, longitudinally wrinkled toward the eyes and antennæ; rest of the head punctured to rugose-punctured; mesonotum with moderately large, mesally dense punctures; petiole smooth and polished. Length 8 mm.....**areolata** Schletterer, Brazil.

13. Tibial spur two-thirds as long as the metatarsus or nearly so.....(14).
Tibial spur not over one-half as long as the metatarsus.....(20).

14. Petiole smooth or punctured.....(15).
Petiole rugose or striate.....(18).

15. Petiole with large isolated punctures (see *concolor*).....(20).
Petiole smooth and polished.....(16).

16. Mesonotum (at least slightly) and scutellum punctured.....17).
Mesonotum smooth, polished; scutellum wrinkled; head polished, the sculpture obscured by vestiture. Black; the antennæ and legs beyond the apex of the femora brownish-red. Length 5 mm.
curvipes Taschenberg, Argentine Republic.

17. Forehead not wrinkled, irregularly, rather coarsely, confluently punctured on the sides, and minutely in the center; well separated, moderately large punctures on the mesonotum in front and along the deep parapsidal grooves, fine irregular punctures posteriorly; scutellum with moderately large separated punctures. Black; the pronotum and mesonotum red; the anterior legs yellow; the four posterior legs brown; the base of the trochanters white. Length 5 mm.

Evaniella cameroni n. sp., British Guiana.

Forehead finely obliquely or arcuately wrinkled; mesonotum finely and sparsely punctate; parapsidal lines not deep; scutellum finely punctate, the punctures obsolete in the middle. Black; antennæ and legs brown. Length 4 mm ..... **tarsalis** Schletterer, Colombia.

18. Head and dorsum coarsely punctured ..... (see *nobilis*, 7).
Head and dorsum finely punctured ..... (19)

19. Dorsum strongly rugose ..... (see *hænschi*, 8).
Dorsum with scattered fine punctures and finer ones between. Black. Length 5 mm ..... **calcarata** Schletterer, Colombia, Brazil.

20. Mesonotum impunctate ..... (21).
Mesonotum punctured ..... (23).

21. Petiole smooth or punctured ..... (22).
Petiole longitudinally striate; head finely punctate; scutellum laterally rugose. Black; anterior legs pale. Length 4 mm.

minor Schletterer, Brazil.

22. Petiole smooth, impunctate ..... (see *curvipes*, 14).
Petiole with large isolated punctures. Black; the anterior tibiæ and tarsi brown. Length 5 mm ..... **concolor** Taschenberg, Brazil.

23. Petiole smooth or punctured ..... (25).
Petiole rugose ..... (24).

24. Coarsely punctate ..... (see *nobilis*, 7).
Head and dorsum finely punctate; humeral angles rounded. Black; antennæ and the forelegs rusty brown. Length 5-5.5 mm.

carinulata Schletterer, British Guiana.

25. Humeral angles sharp ..... (26).
Humeral angles rounded; head finely punctate; mesonotum smooth, several large shallow punctures in the center. Black. Length 5 mm.

dispersa Schletterer, Colombia.

26. Petiole smooth and polished ..... (27).
Petiole closely punctured. Black; head, thorax and petiole more or less reddish; four anterior legs pale. Length 6 mm.

ferruginescens Schletterer, Venezuela.

27. Habitat, Brazilean subregion ..... (28).
Habitat, Argentinean subregion. Black. Length 5 mm.

chilensis Spinola, Chile.

28. Tibial spurs equaling one-half the length of the metatarsus; joint 3 of the antennæ in the male at lease four times as long as the pedicel, the fourth five time as long. Black; head reddish, four anterior legs pale. Length 7 mm ..... **geminata** Schletterer, Colombia.
Tibial spur not one-half as long as the metatarsus; joint 3 of the antennæ in the male only three times as long as the pedicel, the fourth three to

three and one-half times as long as the pedicel. Black; thorax ferruginous; antennæ, four anterior legs and the petiole yellowish. Length 4.5–5 mm..... **nana** Schletterer, Brazil.

29. Furcula with distinctly diverging tynes.....(30).
Furcula with parallel tynes.....(33).

30. Face distinctly punctured.....(31).
Face impunctate, carinate in the center and less distinctly so laterally; a very strong interantennal process; humeral angles rounded; mesonotum with large separated punctures. Black. Length 11–12 mm.
tinctipennis Cameron, Costa Rica, Panama.

31. Color chiefly black.....(32).
Color entirely rusty red. Length 8 mm..... **ferruginea** Kieffer, Mexico.

32. Black; wings hyaline. Length 9.5 mm..... **fascialis** Spinola, Mexico.
Black; face white; wings smoky. Length 11–12 mm.
albofacialis Cameron, Panama.

33. Mesonotum smooth and polished, punctured only on the anterior border, sometimes wrinkled laterally but smooth in the middle.....(34).
Mesonotum punctured, at least in the middle.....(35).

34. Face impunctate; antero-lateral angles of the mesonotum transversely wrinkled with punctures in the wrinkles. Black; antennæ pale in the middle. Length 6.5 mm..... **flagellata** Schletterer, Mexico.
Face finely scarry punctate, almost shagreened; antero-lateral angles of the mesonotum with distinct punctures, among which are minute ones. Black. Length 5 mm..... **maximiliana** Schletterer, Mexico.

35. Parapsidal grooves distinct.....(36).
Parapsidal grooves obsolete; face rugosely punctured. Black; pronotum and mesothorax red; antennal joints 2–4, trochanters and apex of the petiole white. Length 6.5 mm.... **trochanterata** Cameron, Panama.

36. Longer tibial spur one-half as long as the metatarsus or less.....(37).
Longer tibial spur three-fourths as long as the metatarsus; face punctured, not keeled mesally. Black; face white. Length 8 mm.
albispina Cameron, Panama.

37. Hind coxæ obscurely or finely punctured.....(38).
Hind coxæ coarsely to rugosely punctured.....(39).

38. Forehead with a mesal keel, on each side of which it is shagreened; mesonotum rugosely punctured. Black; antennal joints 2–4 and apex of the petiole white. Length 7–8 mm.. **ornaticornis** Cameron, Panama.
Forehead without a mesal keel, finely punctured, a depression above each antenna; middle of the mesonotum with large punctures, sides shining, aciculated. Thorax, head, scape and feet in part red; antennal joints 2–4, trochanters and apex of the petiole white; abdomen black. Length 6.5 mm..... **varicornis** Cameron, Panama.

39. Mesonotum mesally with large deep punctures, laterally slightly shagreened; scutellum rugosely punctured. Black. Length 7 mm.
rugifrons Cameron, Panama.
Mesonotum mesally subcoarsely and sparingly, anteriorly very finely, punctate, laterally smooth; scutellum coarsely and rather closely punctate; posterior coxæ rugose-punctate above. Black; thorax ferruginous. Length 6 mm..... **robusta** Schletterer, Mexico.

SZEPLIGETELLA n. gen.

Type.—Evania sericea Cameron.

This genus differs from *Acanthinevania* in the mouth parts, which resemble more closely those of *Evania;* the labrum is broad and highly chitinized and the ligula long; the third joint of the labial palpus is very much inflated, two or three times as broad as long. The posterior tibiæ and tarsi are spiny, as in *Acanthinevania.*

So far only one species is known, the only member of the subfamily native to the Hawaiian Islands.

I take great pleasure in dedicating this genus to Herr Victor Szepligeti, whose work on the Evaniidæ as well as on other insects is most admirable.

Szepligetella sericea Cameron.

Three males, Kona, Hawaii, September, 1896 (Koebele); July, 1892, 600 feet (Perkins). One female, Kona, Hawaii, July, 1892, 600 feet (Perkins).

Specimens in the collection of the U. S. National Museum.

ACANTHINEVANIA n. gen.

Type.—Evania princeps Westwood.

This genus differs from *Evania* in the arrangements of the mouthparts and in the spiny character of the posterior tibiæ. The labium consists of two moderately chitinized plates which fold in the middle and do not conceal the long ligula; the third joint of the labial palpi is not dilated and thus not noticeably different from the second (Fig. 26). The cheeks are usually long, and the head seen from in front has usually an oblong appearance. The spiny character of the posterior legs may be used as a reliable recognition character.

The genus replaces *Evania* in the Australian region. The two mingle in the Malayan subregion of the Oriental, and two African species are doubtfully referred to this genus.

TABLE TO THE SPECIES OF ACANTHINEVANIA.

ORIENTAL REGION, MALAYAN SUBREGION.

1. Wings hyaline or light brown.....(2).
   Wings fusco-violaceus.....**shelfordi** Cameron, Borneo.
2. Furcula with divergent tynes.....(3).
   Furcula with parallel tynes or rudimentary.....(6).

3. Wings light brown; mesonotum wrinkled .....(5).
   Wings hyaline; mesonotum smooth, with a few scattered punctures.....(4).
4. Petiole obliquely, rather coarsely wrinkled; humeral angles sharp. Length 7-7.5 mm..... **verrucosa** Schletterer, Philippines.
   Petiole very finely longitudinally striated; humeral angles strongly rounded. **sumatrensis** Enderlein, Sumatra.
5. Petiole wrinkled. Length 8 mm.....**alboannulata** Szepligeti, Java.
   Petiole shining, the wrinkles obsolete. Length 11 mm. **orientalis** Szepligeti, Borneo.
6. Furcula with parallel tynes; propodeum above thickly and coarsely punctured; mesonotum with coarse scattered punctures. **impressa** Schletterer, Philippines and Polynesian subregion.
   Furcula rudimentary; propodeum wrinkled above; mesonotum with microscopic punctures.....**micholitzi** Enderlein, Sumatra.

AUSTRALIAN REGION, AUSTRO MALAYAN AND AUSTRALIAN SUBREGIONS.

1. Head and mesonotum distinctly punctured, wrinkled or striate (finely punctured and weakly shining in *australiensis*).....(2).
   Head and mesonotum smooth and polished, the latter with a few scattered punctures. Tibiæ, tarsi and apex of the femora of the anterior legs and antennal joints 4-7 rusty yellow. Length 9 mm. **argenteocauda** Enderlein, New Guinea.
2. Furcula with parallel tynes.....(3).
   Furcula with divergent tynes. Color black...**magretti** Schletterer, Celebes.
3. Humeral angles sharp.....(8).
   Humeral angles rounded .....(4).
4. Face wrinkled or striate.....(5).
   Face finely punctured, with a long median carina. Length 7 mm. **lucida** Schletterer, Australia.
5. Length 11-14 mm.; face channeled or finely striate .....(6).
   Length 4 mm.; face finely wrinkled, weakly shining. **australiensis** Szeplegeti, New South Wales.
6. Face coarsely longitudinally channeled, without a distinct median carina. Length 13-14 mm.....(7).
   Face finely longitudinally striate, with a short median carina. Length 11-12 mm..... **exima** Schletterer, Australia.
7. Forehead longitudinally wrinkled, above, together with the vertex, irregularly wrinkled; temples with very coarse punctures, almost reticulate; sides of the face and forehead and the temples strongly silvery hairy. **princeps** Westwood., New South Wales and near New Guinea.
   Forehead and vertex as strongly and regularly channeled as the face; temples longitudinally striate, with coarse punctures between; inner orbit and the temples weakly hairy....**striatifrons** Kieffer, Australia.
8. Truncature of the propodeum concave, with a more or less distinct mesal angle.....(9).
   Truncature of the propodeum flat or convex (very slightly impressed in *similis* and *similata*).....(15).

9. Truncature of the propodeum moderately impressed, the surface coarsely reticulate ..... (10).

Truncature of the propodeum very deeply impressed, the middle entirely smooth; mesonotum coarsely and sparingly punctured.

impressa Schletterer, Philippines, Polynesia and New Guinea.

10. Face with a few longitudinal wrinkles, a distinct mesal carina, and sometimes one on each side, in addition to the carina separating the face from the cheeks; mesonotum coarsely and rather thickly punctured ..... (12).

Face punctured or rugosely punctured, without mesal, but sometimes with lateral carinæ; petiole one and one-half times as long as the distance from its insertion to the scutellum or less ..... (11).

11. Face plainly but shallowly wrinkly punctured; mesonotum with coarse punctures, mesally dense. Black.

mediana Schletterer, New Britain.

Face finely punctured with a few coarse punctures; mesonotum polished with very fine scattered punctures and a few coarser ones. Black; scape, femora and tibiæ of the four anterior legs yellowish-red..

tomentosa Szepligeti, New Guinea, New Pommern.

12. Face with three carinæ, one in the middle and one on each side separating the face from the cheeks; posterior metatarsus as long as the three following joints together ..... (13).

Face with five carinæ; one in the middle and two on each side, the outer pair separating the face from the cheeks; posterior metatarsus only as long as the two following joints together; petiole with scattered punctures, twice as long as the distance from its origin to the scutellum. Black; forelegs, except the coxæ and trochanters, middle femora and tibiæ, hind coxæ and under side of the femora, propodeum and petiole, red; tarsi of the middle legs, trochanters, upper side of the femora, and the tibiæ and tarsi of the hind legs reddish-brown.

quinquelineata Kieffer, Australia.

13. Petiole with scattered punctures; one and one-half times as long as the distance from its origin to the scutellum ..... (14).

Petiole thickly punctured among longitudinal wrinkles; twice as long as the distance from its origin to the scutellum. Entirely black, except a red spot at the base of the hind femora..**villosicrus** Kieffer, Australia.

14. Red; base of the cheeks, a stripe on the face, antennæ, middle and posterior tarsi, hind tibiæ, end of the middle tibiæ and of the hind femora and the abdomen black or brownish-black.

versicolor Kieffer, Australia.

Black; front tibiæ and tarsi, and the abdomen, except its apex, red; middle and hind legs dark reddish-brown.

versicolor var. **erythrogaster** Kieffer, Australia.

15. Propodeum above the petiole more or less rugose; face rugose or striate; parapsidal lines inconspicuous or obsolete ..... (16).

Propodeum above the petiole not rugose ..... (18).

16. Petiole longitudinally wrinkled or striate; the longer tibial spur as long as or longer than one-half the metatarsus ..... (17).

Petiole subdensely confluently punctured; longer tibial spur less than one-half the length of the metatarsus; face shallowly scarry punctured; forehead very thickly and coarsely punctured; mesonotum coarsely, in the middle densely, punctured. Black. Length 12 mm.

humerata Schletterer, Australia.

17. Face shallowly punctured and indistinctly longitudinally wrinkled; mesonotum scarry punctured, forming indistinct wrinkles posteriorly; petiole rather coarsely longitudinally wrinkled. Black; antennæ and legs brown. Length 7 mm.....**helleri** Schletterer, East Australia.

Face coarsely, longitudinally to obliquely striate; mesonotum indistinctly longitudinally wrinkled, with thick, coarse, scarry punctures among the wrinkles; petiole obliquely to longitudinally striate. Black. Length 9 mm..... **scabra** Schletterer, Australia.

18. Petiole obliquely striate above.....(19).

Petiole not striate but smooth, punctured or at most rugose-punctured above.....(22).

19. Mesonotum coarsely rugosely punctured; parapsidal grooves absent....(20).

Mesonotum sparingly coarsely punctured; parapsidal grooves very indistinct; humeral angles very sharp. Length 7 mm.

angulata Schletterer, Australia.

20. Posterior ocelli farther from each other than from the compound eyes..(21).

Posterior ocelli nearer to each other than to the compound eyes.....(24).

21. Head and mesonotum coarsely rugose; posterior legs plainly wrinkled on the sides; longer tibial spur somewhat longer than one-half the metatarsus. Length 7 mm..... **major** Szepligeti, New South Wales.

Vertex punctured; forehead wrinkled; face longitudinally striate, the striæ sometimes confluent; mesonotum coarsely rugosely punctured; posterior legs smooth or microscopically punctate, a very few larger punctures on the femora, and the coxæ coarsely punctured.

szepligeti n. sp., New South Wales.

22. Petiole smooth above .....(23).

Petiole punctured or rugosely punctured above .....(25).

23. Posterior ocelli nearer to each other than to the compound eyes; head and mesonotum rugose. Length 5 mm.....(24).

Posterior ocelli a little nearer the compound eyes than to each other; face longitudinally to irregularly wrinkled; mesonotum rugose-punctate. Length 8–9 mm...**mnlleri** Schletterer, Australia and New Britain.

24. Scape of the male somewhat longer than the third joint, this twice as long as the second and shorter than the fourth.

similis Szepligeti, New South Wales.

Scape of the male somewhat shorter than the third joint; scape of the female as long as joints 2 + 3; the third joint three times as long as the second and somewhat longer than the fourth.

similata Szepligeti, New South Wales.

25. Face punctured.....(26).

Face rugose, at least laterally, or striate.....(27).

26. Longer hind tibial spur shorter than one-half the metatarsus; furcula obtuse, with scarcely distinct tynes (see 16). Length 12 mm.

humerata Schletterer, Australia.

Longer hind tibial spur as long as one-half the metatarsus; furcula with distinct tynes; petiole finely punctured; face sparingly scarry punc-punctured; mesonotum very thickly and coarsely punctured. Length 8–9 mm..... **australis** Schletterer, Australia.

27. Petiole twice as long as the distance from its origin to the metanotum; mesonotum only slightly convex .....(28).

Petiole only one and one-half times as long as the distance from its origin to the metanotum; mesonotum and scutellum strongly convex; rather closely and very coarsely scarry punctate, with a tendency to wrinkling; petiole distinctly and rather closely punctured. Length 7–9 mm..... **genalis** Schletterer, Australia.

28. Petiole more or less rugosely punctate, laterally obliquely rugose; mesonotum in the middle coarsely and thickly punctured, at the sides almost smooth. Black, except the tibiæ and tarsi of the forelegs and the antennæ except the apex are reddish-yellow. Length 6 mm.
erythrocnemis Schletterer, New Britain.

Petiole finely and densely punctured; face longitudinally wrinkled; forehead rugosely punctured; mesonotum subcoarsely and moderately densely punctured. Black. Length 10–11 mm.
longigena Schletterer, Australia.

Acanthinevania princeps Westwood.

(Figs. 10, 48, 64 and 79.)

One male and five females in the collection of the American Museum of Natural History, and one female in the author's collection, all from New South Wales.

Acanthinevania genalis Schletterer.

(Fig. 26.)

One male and three females in the collection of the American Museum of Natural History, and one female in the author's collection, all from New South Wales. The propodeum is rufous.

Acanthinevania longigena Schletterer.

Male.—Scape about as long as joint three; pedicel about one-fourth as long as joint three; this scarcely shorter than the fourth joint; abdomen oval. Entirely black. Length 8.5 mm.

One male in the collection of the American Museum of Natural History.

Acanthinevania szepligeti n. sp.

(Fig. 47.)

Female.—Black. Sternum sericeous. Head seen from above transverse-quadrate; the eyes prominent; the vertex behind them deep. Eyes moderately long and narrow; their inner margins divergent below; the malar space long, two-thirds or more of their length; the antennæ inserted a little above the base of the eyes; temples broad, very broad below; posterior ocelli a little nearer the compound eyes than to each other; vertex umbilicately punctured, the punctures

well separated; forehead depressed, coarsely punctured to longitudinally wrinkled; a strong mesal carina and two lateral carinæ on the convex face which remain parallel, not converging toward the apex of the clypeus; the lateral carinæ join anteriorly the strong carina which separates the cheeks from the face; between the carinæ the face is longitudinally striate, the striæ not coarse; the cheeks below the eyes are longitudinally wrinkled; the temples are punctured like the vertex; the scape is slightly longer than the distance on the vertex between the compound eyes; about one-tenth longer than joints 2 + 3; the pedicel is a little under one-quarter the length of the third joint, which is one-quarter longer than the fourth.

The humeral angles are very short, the anterior margin of the dorsum appearing as a straight line; the pronotum and upper corner of the mesopleuræ are smooth and polished; the mesonotum and scutellum are coarsely, rugosely punctured, tending to longitudinal wrinkling; the propodeum and less markedly the pleuræ are reticulately punctured; the venter more finely scarry punctured; the furcula has parallel tynes.

Posterior coxæ closely, coarsely punctured; rest of the legs very finely punctured with a few larger pock marks on the femora; posterior tibiæ and tarsi with strong spines; the longer tibial spur considerably longer than one-half the metatarsus; the latter as long as joints 2-4 together; claw (Fig. 47) with a small tooth within, at right angles to and much smaller than the outer ray. Wings hyaline; veins M beyond m-cu, M_{1+2}, M_1, longitudinal part of M_2 and m faintly marked.

Petiole coarsely obliquely wrinkled, above longitudinally. Abdomen black, polished, subtriangular; the second to fourth segments with a few punctures above; pygidium produced into a short process which normally conceals the ovipositor.

Hab.—New South Wales.

Type.—One female in the collection of Cornell University.

I take pleasure in dedicating this species to Herr Victor Szepligeti, who has made substantial contributions to our knowledge and classification of the Evaniidæ of this and other regions.

EVANIELLA Bradley.

Type.—Evaniella semæoda Bradley.

For a description of this genus see page 142.

It is probable that nearly all the neotropical species listed under *Evania* really belong here. I have made no attempt to separate them.

The following new species is included in the table of the genus *Evania*, in which the determination of all specimens falling in this genus from outside of the United States should be sought.

Here belongs *Evania semirubra* Cresson from Cuba.

Evaniella cameroni n. sp.

Black; pronotum and mesonotum red; anterior legs, except the apex of the trochanters externally, which are brown, and base of the middle and posterior trochanters, yellow. Sparingly pubescent. Head from above transverse-quadrate; eyes prominent; posterior ocelli nearer the compound eyes than to each other. From the side the temples are narrow, little widened below; the eyes very large; the malar space quite small. From in front the face is nearly round, the inner margins of the compound eyes almost straight, slightly diverging below; the sculpture of the face almost obscured by vestiture, in a favorable light seen to be finely and irregularly but not very roughly punctate; a long distinct carina extends on each side from the outer margin of the clypeus upward to below a point midway between the antennæ and the margin of the eyes; forehead with fine close punctures, in front of the compound eyes these are replaced by larger more separated round punctures, which continue on the vertex, temples and cheeks; forehead with a distinct median carina. Antennæ filiform; scape over four times as long as the pedicel, five-eighths as long as joints 3 + 4; the pedicel one-third as long as joint 3, the latter three-fourths as long as joint 4.

Pronotum scarcely notched above by the mesonotum; humeral angles squarely cut; mesonotum anteriorly and the side of the scutellum with a few scattered round punctures, otherwise smooth; anterior, parapsidal and lateral grooves very distinct; mesopleuræ punctured, with a small smooth and polished area above; furcula with short indistinct parallel tynes; propodeum reticulate; the reticulations produced into oblique bars over a short area on the sides. Posterior tibial spur two-thirds as long as the metatarsus.

Petiole impunctate; abdomen broadly elliptical; the apical segments pubescent.

Hab.—British Guiana, Bartica, May 10, 1901, R. J. Crew.

Type.—In the author's collection.

ZEUXEVANIA Kieffer.

1902. *Zeuxevania* Kieffer, Gen. Insec., 2, p. 4.

Type.—*Evania dinarica* Schletterer.

In this genus (see Figs. 80 and 81) the cell M_4 is elongate and situated nearer to the base of the wing than in *Evania*, the veins m-cu and part of the base of M form its anterior boundary, and join together to form a regular arc. At the same time r-m and M_{3+4} become interstitial, appearing as a single almost longitudinal vein, instead of r-m joining M a short distance before the separation of M_{1+2} and M_{3+4}, as is the case in *Evania*. It is evident that the modification has proceded from the type that we have in *Evania* by the base of the free part of M migrating backward along R to a distance almost halfway between the base of the wing and the stigma, and then in some of the species becoming lost, but in a new species that I have here to describe remaining as a faint vein (Fig. 80).* The mouthparts are shown in Fig. 32.

Occurs in the Palearctic, Ethiopian and Oriental regions. Six species in all.

* This has been recently described as *Parevania*, see addenda.

TABLE TO THE SPECIES OF ZEUXEVANIA.

1. Palearctic region.....(2).
   Ethiopian region.....(3).
   Malayan subregion of the Oriental.....(4).
2. Petiole punctured.....**splendidula** Costa, Sardinia.
   Petiole striated.....**dinarica** Schletterer, Austria, Egypt.
3. Petiole twice as long as the distance of its insertion from the metanotum, smooth and impunctured.
   tenuistylus Enderlein, German East Africa.
   Petiole but little longer than the distance of its insertion from the metanotum, smooth and with a few punctures.
   globiceps Enderlein, German East Africa.
4. Entirely black; petiole obliquely striate.....**javanica** Westwood, Java.
   Prothorax and mesothorax, anterior part of the metapleuræ and anterior coxæ red; petiole smooth and polished .....**schlettereri** n. sp., Java.

Zeuxevania schlettereri n. sp.

(Figs. 32, 50, 80.)

♀.—Black, except the prothorax and mesothorax, anterior part of the metapleuræ and the anterior coxæ are red; the anterior tibiæ and less distinctly the middle tibiæ are yellowish-brown; base of the posterior tibiæ and trochanters white. Slightly sericeous. Head seen from above subglobular; posterior margin truncate; deep behind the eyes, which are not prominent; the postero-lateral corners slightly rounded. The profile is broad, the eye moderately long, only slightly oblique; the temples only slightly widened below; the antennæ inserted on the convex forehead at about the lower third of the eye; malar space about one-third the length of the eye or less. Face from in front almost round. Entire head very minutely, rather closely punctate, appearing smooth under a low power; a carina separating the cheeks and face; two short tooth-like processes just below the antennæ; ocelli forming an equilateral triangle; the posterior ones about equally far from each other and from the compound eyes; antennæ filiform, the scape little longer than joint three, the latter subequal to joint four, and more than twice as long as the pedicel.

The humeral angles rounded; the mesonotum, mesoventer and scutellum punctured similarly to the head; the upper part of the mesopleuræ variously finely punctured, wrinkled or smooth; the rest of the propodeum shallowly reticulate; the furcula with divergent tynes, but these are very small and at first glance one would be led to think it truncate and without tynes; the middle and posterior coxæ are placed close together.

The wings are hyaline, a little dusky at the apex (Fig. 80). The legs are moderately elongate; the posterior coxæ closely punctured; the tibiæ and tarsi without distinct spines; the longer tibial spur two-thirds as long as the metatarsus; the latter as long as joints 2-4 together; the claw bifid, with a stout inner ray and a much more slender outer ray (Fig. 50).

Petiole smooth and polished; abdomen nearly round, the pygidium not produced.

One paratype has the apex of the petiole white.

I take pleasure in dedicating this species to Dr. August Schlett-

erer, who has done more to bring order out of chaos in this family than any other man.

Hab.—Java.

Type and two paratypes in the collection of the Cornell University. One paratype in the author's collection.

EVANISCUS Szepligeti.

(1903. *Pseudevania* Kieffer, misprint for *Zeuxevania*, Zeitschr. f. Hym. u. Dipt., iii, p. 111, see corrigenda to volume.)

1903. *Evaniscus* Szepligeti, Ann. Mus. Nat. Hung., i, pp. 375, 378.

Type.—*Evaniscus tibialis* Szepligeti.

In the Zeit. f. Hymen. u. Dipt., iii, p. 111, Kieffer says that *Evania trochanterata* Cameron and *E. marginata* Cameron belong to *Pseudevania* (misprint for *Zeuxevania*, see Zeitsch. f. Hym. u. Dipt., vol. iii corrigenda). *E. trochanterata* Cameron is a true *Evania*, to which genus it must be returned forthwith. The wing venation as figured by Cameron in the Biologia Centrali-Americana is that of *Evania*, and not of *Zeuxevania* or other genus. *E. marginata* is neither an *Evania* nor a *Zeuxevania*, but is congeneric with the subsequently described *Evaniscus tibialis* of Szepligeti. Hence it should stand in the genus *Evaniscus* Szepligeti of which *tibialis* is the type.

TABLE TO THE SPECIES OF EVANISCUS.

1. Propodeum coarsely reticulate..... .....(2).
   Propodeum rugosely punctured; furcula with parallel tynes.
   marginata Cameron, Guatemala.
2. Petiole curved, with six rather distinct longitudinal carinæ, between these strongly aciculated; furcula with divergent tynes.
   tibialis Szepligeti, Venezuela.
   Petiole moderately slender, finely and thickly punctured, on the sides somewhat aciculate.....**rufithorax** Enderlein, Bolivia and Peru.

SEMÆOMYIA n. gen.

Evania and *Brachygaster* of authors in part.

Type.—*Semœomyia kiefferi* n. sp.

Color usually black, with more or less red or yellow. Head large, broader than the thorax, scarcely or somewhat transverse as seen from above (Fig. 15); eyes large, often very large, extending far toward each other on the vertex and leaving but a small malar space and a narrow front (Fig. 14); ocelli nearly in an equilateral triangle, large and usually very close to the eyes. Antennæ filiform in the males, in the females strongly incrassate beyond the fifth segment (Fig. 55). The mouth parts are shown in Figs. 33 and 34.

Body sometimes elongate, the middle coxæ being placed far posteriorly; mesopleuræ smooth and polished, with a distinct femoral groove; sculpture of a small area on the side of the propodeum of distinctive character, sometimes smooth and polished; furcula usually consisting of a long process with very small parallel or divergent tynes.

Posterior legs long; the tarsal claw bifid, the inner ray larger and stouter than the outer one, the latter sometimes nearly obsolete (Figs. 51 and 52).

Wings hyaline; the venation as shown in Fig. 85.

Abdomen similar in both sexes, nearly round, the pygidium not produced.

The size is usually small, the thorax slender and tapering posteteriorly. The punctation is generally fine or absent. There are 13 species, all from the Neotropical region.

TABLE TO THE SPECIES OF SEMÆOMYIA.

1. Central American subregion ..... (2).
   Brazilian and Argentine subregions ..... (3).
2. Mesonotum plainly punctate; posterior metatarsus plainly longer than the remaining joints taken together; cheeks of the male as long as the scape; first joint of the flagellum of the male one and one-half times as long as the pedicel, second twice as long as the pedicel; parapsidal grooves obsolete; head coarsely punctured; pronotum with prominent humeral angles. Length 3.5–4 mm.... **azteka** Schletterer, Mexico.
   Mesonotum smooth and polished, or with a few scarcely noticeable shallow punctures; the posterior metatarsus only as long as the remaining joints together; forehead moderately closely punctate; temples of even width from above to below; scape of the male one-half as long as joints 2 and 3; joint 3 two and one-half times as long as the pedicel; pronotum with rounded humeral angles. Black. Length 4 mm. **nitida** Cameron, Panama.
3. Mesonotum plainly punctured ..... (4).
   Mesonotum not punctured ..... (8).
4. Propodeum between the metanotum and the insertion of the petiole punctured, not wrinkled; furcula with short divergent tynes..... (7).
   Propodeum above indistinctly transversely wrinkled; furcula with parallel tynes..... (6).
   Propodeum reticulate ..... (5).
5. Propodeum on the sides coarsely reticulate; head thickly and moderately finely punctured; face thickly, very finely and moderately shallowly punctured; mesonotum shiny, polished, the middle piece with sparse shallow punctures; parapsidal and lateral carinæ distinct. Length 5–6 mm..... **magna** Enderlein, Peru.

Propodeum very finely reticulate, more finely near the lateral edges; head thickly and finely punctured; mesonotum polished and shiny, the middle piece sparsely and finely punctured, the lateral pieces rather thickly and very finely punctured; parapsidal and lateral carinæ distinct. Length 4–5 mm..... **reticulifer** Enderlein, Peru.

6. Face finely and densely punctured. Black. Length 6–7 mm.
gredleri Schletterer, Brazil.

Face moderately, finely and sparsely punctured, with minute intermediate punctures. Black, except the face, mandibles and antennæ beneath are pale yellow; the four anterior legs rusty yellow.
flavescens Schletterer, Brazil.

7. Face very finely and moderately closely punctate, temples much more shallowly punctate; anterior part of the side of the propodeum concave, with closely parallel cross-bars; body normal, the middle coxæ not placed exceptionally distant from the anterior. Red; the face, four anterior legs, posterior coxæ beneath and trochanters at base yellow; abdomen black; posterior legs brown. Length 4 mm.
taschenbergi n. sp., British Guiana.

Face less finely and more deeply punctured; cheeks and temples smooth and polished with a very few minute punctures; anterior part of the side of the propodeum scarcely concave, smooth and polished; without cross-bars, except along the edge. Red; abdomen brown. Length 6 mm.....**barticensis** n. sp., British Guiana.

8. Furcula with parallel tynes.....(9).
Furcula with divergent tynes.....(10).

9. (See also *fraterna* under 14.)

Posterior metatarsus shorter than the four remaining joints together; longer tibial spur shorter than one-half the length of the metatarsus. Black; first four antennal joints and the coxæ except their apex yellowish-red; fifth antennal joint and the apex of the petiole white. Length 4 mm..... **oculata** Szepligeti, Brazil.

Posterior metatarsus as long as the remaining four joints together; tibial spur as long as one-half the matatarsus. Ferruginous; face, cheeks, temples and two anterior legs white; petiole pale reddish posteriorly, propodeum darkened, especially posteriorly. Length 4 mm.
albata Schletterer, Colombia.

10. Face distinctly punctured.....(11).

Face smooth and impunctate; mesonotum smooth and polished with fine parapsidal lines. Ferruginous; propodeum black; abdomen and posterior legs brown. Length 3–3.5 mm.
gayi Spinola, Colombia and Argentine subregion.

11. Face in the middle with a distinct tubercle; head and face very finely and shallowly punctured.....(12).

Face without a median tubercle; head and face less finely punctured...(13).

12. Cheeks smooth, polished and impunctate; antennæ inserted far below the middle of the eyes; ocelli large and close together; humeral angles rounded; posterior coxæ finely punctate; posterior tibial spur one-half the length of the metatarsus. Black, except the first five antennal joints, anterior legs except the tarsi, middle legs except the tibiæ and

tarsi, posterior coxæ and trochanters, mesopleuræ, venter, spot on the truncature of the propodeum and the apex of the petiole yellow. Length 3.5 mm.....**kiefferi** n. sp., British Guiana.

Cheeks moderately finely and densely punctate; antennæ inserted at the middle of the eyes; posterior ocelli a little farther from each other than from the compound eyes; humeral angles moderately sharp; posterior coxæ beneath subcoarsely and densely punctured; tibial spur one-half as long as the metatarsus. Black; four anterior legs brown. Length 3-3.5 mm...**lævinscula** Spinola, Colombia, Chili.

13. Forehead with a number of widely separated fine punctures; face with close fine punctures, transverse wrinkly just below the antennæ. Brown, with antennæ, at least their bases, pale yellowish; anterior and middle legs, posterior femora and the apex of the petiole whitish. Length 3 mm.....**trinidadensis** Ashmead, Trinidad.

Forehead and face conspicuously, finely and subdensely punctate.....(14).

14. Petiole with only a few shallow punctures. Length 3.5 mm.

fraterna Enderlein, Peru.

Petiole laterally furrowed its entire length.

basalis Schletterer, Colombia.

Semæomyia kiefferi n. sp.

(Figs. 14, 15 and 52.)

♀.—Black; the first five joints of the antennæ, the mesopleuræ, vertex, large spot on truncature of the propodeum, anterior legs except tarsi and apex of tibiæ, posterior coxæ and base of trochanters and the apex of the petiole yellow. Head seen from above (Fig. 15) rounded, somewhat transverse, the eyes very large, on the vertex comparatively close, reaching almost to the posterior margin of the head; ocelli in an equilateral triangle, the posterior ones over twice as far from each other as from the compound eyes. From the profile (Fig. 14) nothing is seen except the compound eye and a narrow bit of cheek and temple below; the antennæ are inserted below the lower two-thirds of the eyes. From in front the head is round, the front narrow, the inner margins of the eyes diverging a little below; a distinct tubercle in the middle of the face below; face and forehead densely, finely punctured; cheeks, temples, vertex and occiput impunctate, smooth and polished; scape one-third longer than joints 2 + 3; these subequal, as is also 4; beyond the fourth joint the antennæ are strongly inflated, tapering again apically.

The humeral angles are rounded; mesonotum and scutellum and most of the mesopleuræ smooth, polished and impunctate; metapleuræ and propodeum shallowly reticulate, the area on the side irregularly shallowly wrinkled; furcula with the tynes divergent but very short.

Wings hyaline; longer tibial spur one-half the length of the metatarsus; the latter one-fifth longer than joints 2-5 together; the tarsal claw small, bifid, the inner ray much stouter than the outer one (Fig. 52).

The petiole is smooth; the abdomen round and polished. Length 3.5 mm.

Hab.—Bartica, British Guiana, May 10, 1901, collected by R. J. Crew, and presented to the writer by Mr. Henry L. Viereck.

Type.—In the author's collection.

Semæomyia barticensis n. sp.

(Figs. 33, 34, 51, 55 and 85.)

♀.—Red; apex of the petiole and the four anterior legs yellowish; posterior tarsi brown; abdomen and antennæ beyond the fifth segment black. Head seen from above transverse, rounded in front and truncate behind; the eyes very large, reaching far up on the vertex and to the posterior margin; ocelli large, in an equilateral triangle, the posterior ones about their diameter's length apart, a little less removed from the compound eyes. In profile little is visible except the compound eyes; the malar space moderately long, the temples obsolete above, widened below; the antennæ are inserted below the middle of the eyes. From in front the head is slightly triangular, the margins of the eyes diverging below; the face has no median tubercle, is moderately closely punctate; the forehead more closely; the temples and cheeks smooth and polished with only a few small punctures; antennæ shown in Fig. 55.

Humeral angles rounded; the mesonotum smooth and polished, with several moderate sized punctures scattered over it, these a little thicker on the scutellum and on the propodeum above the petiole; anterior, parapsidal and lateral grooves distinct; mesopleuræ impunctate, shining, except the anterior swelling which is finely punctured; propodeum except above the petiole shallowly reticulated, the area on the side smooth and shining; the middle coxæ are placed far posteriorly, in juxtaposition to the posterior, the body being considerably elongated; the furcula has very short divergent tynes.

The wings are hyaline. The longer tibial spur is more than one-half the length of the metatarsus; the latter is about one-fourth longer than the remaining joints united. The tarsal claws are very small and mostly broken off in the type, but in the remaining one the inner ray seems to be stout and the outer ray rudimentary (Fig. 51).

The petiole is sparingly punctured above and at the base of the sides, the apex of the sides being transversely wrinkled; it is more than twice as long as the distance from its insertion to the metanotum. Abdomen round, polished. Length 6 mm.

Hab.—Bartica, British Guiana, collected by R. J. Crew and presented to the author by Mr. H. L. Viereck.

Type.—One ♀ in the author's collection.

Semæomyia taschenbergi n. sp.

Red; face, cheeks and temples, scape beneath, trochanters at base and tibial spurs and apex of petiole yellow; rest of posterior legs and base of the petiole brown; abdomen and propodeum around the coxæ black. Head seen from above truncate behind, rounded in front, the anterior edge prominent and emarginate mesally between the eyes; these reaching to the posterior edge; ocelli farther from each other than from the compound eyes. Profile broad, the temples linear above and widened below; malar space moderate; antennæ inserted below the middle of the eyes. From in front the eyes are prominent; their inner margins diverging below; face moderately, finely punctured; temples and cheeks much more sparingly; forehead more closely and coarsely punctured, the vertex smooth.

The humeral angles are rounded; the anterior, lateral and parapsidal grooves well marked; the mesonotum, scutellum and propodeum above the petiole smooth and polished, with few moderate sized scattered punctures; the mesopleurae smooth and shining; the anterior swelling peppered with exceedingly minute punctulations; the metapleurae and propodeum reticulate, the area between them concave, with transverse cross-bars; the furcula has very short divergent tynes.

Wings dusky at the apex. Longer tibial spur one-half as long as the metatarsus; this as long as the remaining joints together; claws small, bifid, the inner ray longer and stronger than the outer.

Petiole sparingly punctured. Abdomen round. Length 4 mm.

I take pleasure in dedicating this species to Professor E. Taschenberg, one of the few contributors in recent years to our knowledge of this family.

Hab.—Bartica, British Guiana, collected by R. J. Crew, May 17, 1901.

Type.—In the author's collection.

SEMÆODOGASTER n. nom.

(Figs. 30, 31, 53 and 84.)

Brachygaster Stephens, *preoc.*, Syst. Cat. Brit. Insec., 1, p. 343.

The name *Brachygaster* has usually been dated from Leach, 1817, Edinburgh Encyclopaedia, but the name as there employed is a *nomen nudum* and without standing. At the place cited, in an article on entomology, Leach under the genus *Evania* mentions *Evania minutus*. As synonymous with this, he parenthetically mentions *Brachygaster minutus* Leach MSS. That is Leach's only reference to the name in print. The first person to properly use the name in Hymenoptera was Stephens in 1829. But in 1826 Meigen had used it in Diptera, and it has since been used in Crustacea and Coleoptera. So it is necessary to change it.

The only described species is the European *minuta* Ol., which Kieffer* maintains is different from the *minuta* of Schletterer.

HYPTIA Illiger.

Type.—*Evania petiolata* Fabricius.

The species *petiolata* of Fabricius is unrecognizable, and until its identity be ascertained, *Evania thoracica* Blanchard, as identified in the first part of this paper, shall stand as type of the genus.

For description of the genus, see the first part of this paper. It is confined to the Nearctic and Neotropical regions.

* Ann. Soc. Ent. France, lxvii, p. 816.

TABLE TO THE SPECIES OF HYPTIA OF THE NEOTROPICAL REGION.

1. Brazilian and Argentine subregions.....(2).
   Central American subregion.....(11).
   Antillean subregion.....(16).
2. Posterior tibiæ and tarsi without distinct spines.....(4).
   Posterior tarsi with distinct spines.....(3).
3. Mesonotum irregularly reticulate; tibiæ with short spines. Black; dorsum except the scutellum red; forelegs partly brownish-red. Length 9 mm..... **hirsuta** Taschenberg, Brazil.
   Mesonotum coarsely punctured, sparingly in front and laterally, more densely posteriorly. Black; thorax and anterior legs reddish. Length 8-9 mm..... **amazonica** Schletterer, Brazil.
4. Face impunctured, smooth and polished.....(5).
   Face punctured or rugose or both.....(6).
5. Dorsum strongly punctured; cheeks weakly longitudinally striate. Black; base of the legs and antennæ brown. Length 2.5 mm. **parva** Enderlein, Peru.
   Dorsum impunctate, smooth and polished. Yellowish-red and black. Length 4.5 mm..... **festiva** Taschenberg, Brazil.
6. Face finely punctured, or coarsely punctured with fine punctures between.....(7).
   Face rugose or rugose-punctured.....(9).
7. Petiole about twice as long as the distance from its insertion to the scutellum. Black; temples beneath and four anterior legs reddish-brown. **chalcidides** Enderlein, Peru.
   Petiole but little longer than the distance from its insertion to the scutellum.....(8).
8. Furcula with parallel tynes. Head and antennæ yellowish-red; thorax reddish. Length 3 mm..... **ruficeps** Shuckard, Venezuela, Brazil.
   Furcula with divergent tynes. Black; mesonotum and scutellum red; anterior legs yellowish-red, except the coxæ and trochanters. **rufosignata** Kieffer, Argentina.
9. Furcula with parallel tynes.....(10).
   Furcula with divergent tynes. Yellowish-red; the flagellum and abdomen black; posterior tarsi brown. Length 5 mm. **nigriventris** Szepligeti, Brazil.
10. Longer hind tibial spur shorter than one-half the metatarsus; wings light brown. Shoulders more strongly angled; propodeum coarsely wrinkled, the truncature flat; petiole coarsely and somewhat obliquely wrinkled. Black; scape and the four anterior legs red. Length 5 mm..... **similis** Szepligeti, Brazil.
    Longer hind tibial spur longer than one-half the metatarsus; wings hyaline. Black and more or less rusty red. Length 6 mm. **soror** Schletterer, Guiana, Brazil.
11. Petiole striate.....(12).
    Petiole punctured.....(14).

12. Thorax rugose-punctate. Red; apical half of the antennæ, two spots on the propodeum above, abdomen and posterior tarsi black; apex of the petiole pale. Length 3 mm..... **crassa** Cameron, Panama.
Thorax with separated punctures..... (13).
13. Face transversely rugose-punctured; petiole smooth, except striate above. Black; face, tegulæ, pronotum (= mesonotum ?) and scutellum red. Length said to be 3-7 mm. This may be an error as Schletterer points out, or two species may be here confused.
guatemalensis Cameron, Guatemala.
Face finely but not rugosely punctured; petiole entirely distinctly striulate. Entirely black, except scape and four anterior legs pale. Length 2 mm..... **bakeri** n. sp., Guatemala.
14. Mesonotum coarsely rugosely punctured..... (15).
Mesonotum coarsely and densely punctured. Black; thorax rusty reddish. Length 4 mm.... **occiliaria** Schletterer, Mexico, St. Thomas, Cuba.
15. Hind coxæ punctured behind. Black; head, except vertex, more or less of the thorax and the anterior legs red. Length 5 mm.
cameroni Schletterer, Panama.
Hind coxæ impunctate. Black; pronotum and mesonotum red. Length 6 mm..... **rugosa** Cameron, Guatemala.
16. Head at most rugose-punctate; thorax punctured ..... (17).
Head and thorax strongly rugose. Black; anterior legs brown. Length 7-8 mm..... **servillei** Guérin, San Domingo.
17. Forehead and mesonotum closely punctured; forehead sometimes thickly pubescent..... (18).
Head, mesonotum and scutellum with a few regularly scattered punctures; parapsidal grooves distinct except posteriorly. Velvety black, except that the propodeum is bright red. Length 5 mm.
johnsoni Ashmead, Jamaica.
18. Pronotum not mesally emarginate above; petiole shallowly or wrinkly punctate..... (20).
Pronotum mesally emarginate above; petiole very sparingly punctured or the sculpture obscured by thick white vestiture..... (19).
19. A distinct patch of white hairs near the base of the abdomen above; cheeks very sparingly, face coarsely and closely punctured. Black; the pro- and mesonotum and mesopleuræ above red. Length 5 mm.
weithi Ashmead, Haiti.
No patch of hairs on abdomen; petiole with a few small scattered punctures, cheeks with a few round punctures; face with an indistinct median longitudinal protuberance, with larger irregular punctures over and between which are close minute punctures, giving it a roughened appearance; forehead with remarkably evenly placed, separated, round punctures. Red; antennæ, legs, except coxæ more or less, vertex and abdomen with petiole black..... **poeyi** Guérin, Cuba.
20. Face immediately in front of the base of the antennæ with a median longitudinal protuberance, and very fine wrinkly punctation; forehead clothed with yellowish hairs; furcula truncate, not forked; the longer tibial spur two-thirds as long as the metatarsus. Rusty red; head in part and the abdomen black. Length 4 mm.
stimulata Schletterer, Cuba.

Face without a protuberance, and coarsely sculptured like the rest of the head; forehead bare; furcula with distinct but parallel tynes; the longer tibial spur scarcely one-half the length of the metatarsus. Black; thorax rusty reddish.

ocellaria Schletterer, Mexico, St. Thomas, Cuba.

Hyptia soror Schletterer.

This species was described from both North and South America. But such a range seems almost impossible in view of what we know of the distribution of these insects. I believe that two species have been confused, and I have not included it in the North American fauna.

Hyptia poeyi Guérin.

♂.—Red; antennæ, vertex, legs, except anterior pair in front which are brown, and posterior coxæ behind which are red, abdomen with petiole, except the apex which is black, yellow. Head from above transverse oval, the anterior margin prominent; the vertex forming a rather sharp crest upon which are placed the ocelli; the posterior ocelli more than twice as far from each other as from the compound eyes. From the side the forehead convex; the eye moderate; the temples moderate, slightly widened below; the malar space about one-third the length of the eye. From in front the head is nearly round, somewhat pointed below; the inner margins of the eyes almost parallel; an ill-defined carina separates the cheeks from the face and runs within and removed from the eyes to the altitude of the base of the antennæ; face with irregular confluent coarse punctures, which are everywhere covered and almost obliterated by minute punctures; forehead covered with vestiture, among which a number of round remarkably evenly placed punctures are visible; temples and cheeks with a few moderate punctures. Antennæ filiform; the pedicel one-third as long as the scape, two-thirds as long as joint 3; the latter equalling joint 4; joints 3 + 4 equalling the scape.

Pronotum emarginate above; humeral angles moderately sharp; mesonotum and scutellum evenly covered with round, moderate, separated punctures, between which are a few small ones; parapsidal grooves indistinctly marked in front; mesopleuræ smooth and polished, much depressed mesally; venter minutely punctulate; propodeum shallowly reticulate, coarsely punctured above between the scutellum and the petiole; the sides with two oblique carinæ, between which are almost obliterated irregular cross-bars; furcula with short parallel indistinct tynes.

Posterior tibial spur four-fifths the length of the metatarsus; the latter almost as long as joints 2-5 together; claws with the inner ray much stouter than the outer.

Petiole with a few small scattered punctures; abdomen highly polished; the remaining segments almost concealed under the second and third.

♀.—The female differs from the male in having very dense yellow pubescence on the forehead, giving it a very striking appearance of bearing a yellow mane; the crest on which the ocelli are placed is not so prominent; the flagellum is distinctly thickened beyond its second joint, tapering again at the apex; the pedicel two-ninths as long as the scape, two-thirds as long as joint 3; the latter one-half

longer than joint 4; 3 + 4 over one-half the length of the scape. The tibial spur is almost as long as the metatarsus; the second segment occupies almost the entire abdomen.

I have recognized this species from two probably authentic specimens sent to Mr. Cresson many years ago and now in the collection of the American Entomological Society. As the original description is too meagre to identify the species from, I have drawn up the above description from two specimens sent me by Professor C. F. Baker, collected by him in Havana, Cuba.

Hyptia bakeri n. sp.

Brownish-black; scape and pedicel, four anterior legs mostly, and base of posterior trochanters yellowish. Ocelli almost twice as far from each other as from the compound eyes; latter large; temples narrow, widened below; malar space small; face with a prominent medial V-shaped area, roughened with minute and coarse punctures, on the sides two rows of large separated punctures; a row of punctures surrounds the eyes, and border the temples and cheeks posteriorly; the latter otherwise very scantily punctured; antennæ slightly thickened, the scape equalling joints 2 + 3 + 4, over three times as long as the pedicel, which is one-fifth less than joint 3; the latter slightly less than joint 4; the forehead, vertex and entire dorsum are regularly covered with round separated but rather close punctures, the humeral angles sharp; the mesonotal grooves wanting; mesopleuræ smooth, polished; propodeum shallowly but very coarsely reticulate laterally and posteriorly; furcula short, with parallel tynes. Posterior tibial spur one-half the length of the metatarsus, which equals the rest of the tarsus. Petiole longitudinally striate. Length 2 mm.

Hab.—Champerico, Guatemala, C. F. Baker, one specimen.

Type.—In the collection of C. F. Baker, Para, Brazil.

Hyptia johnsoni Ashmead.

The locality for this should be Jamaica and not Philadelphia, as I pointed out in the Canadian Entomologist, xxxvii, p. 64. Besides the type in the U. S. National Museum, there are two specimens in the collection of the American Entomological Society.

EVANIELLUS Enderlein.

1905, April 11th. *Evaniellus* Enderlein, Zool. Anzeig., xxviii, p. 70.

Type.—*Evaniellus peruanus* Enderlein.

Evidently unaware that I had established a genus *Evaniella* for *Evania californica* Ashmead and others in February, 1905, in the Canadian Entomologist, Enderlein in April of the same year established *Evaniellus* for some South American species. It is to be regretted that the two names are so near alike in form, but the recommendation under Article 36 of the International Code as

given by Dr. Stiles provides that names are not to be rejected because they differ only in termination, so we must retain both names, confusing as such a course may seem in the present instance.

Evaniellus seems to differ from *Hyptia* only in the loss of Cu, so that it is one step further in the evolutional series that the family presents in the reduction of the wing veins (Fig. 87).

There are four species, all from the Brazilian region of the Neotropical.

TABLE TO THE SPECIES OF EVANIELLUS.

1. Face finely punctured.....(2).
   Face rugose or rugose punctured.....(3).
2. Head above rather coarsely punctured; face finely and thickly punctured; diameter of the hind ocellus less than its distance from the compound eyes; petiole strongly, thickly and coarsely punctured, on the side distinctly aciculate. Length 3 mm....**peruanus** Enderlein, Peru.
   Head above rather finely and thickly punctured; face very finely and shallowly punctured; diameter of the hind ocellus equal to its distance from the compound eyes; petiole long, finely but sharply longitudinally striate. Length 4 mm.....**gracilis** Enderlein, Peru.
3. Head rather coarsely rugose; thorax coarsely rugose-punctured, the parapsidal lines not very distinct, the lateral parts polished behind; propodeum coarsely reticulate; petiole distinctly longitudinal wrinkled. Black; flagellum rust red; wings light brown. Length 5 mm.
   brasiliensis Szepligeti, Brazil.
   Head above rather coarsely punctured, face very finely wrinkly punctured; mesonotum coarsely punctured; parapsidal furrows marked by a thickly punctured line; propodeum above thickly punctured, on the sides more reticulate; petiole rather strongly, very thickly punctured and longitudinally striate. Black; the face, cheeks, temples, scape and anterior pair of legs rust yellow; the middle legs yellowish-brown. Length about 4 mm.
   chalcidipennis Enderlein, Bolivia.

ADDENDA.

The descriptions of the following species were not accessable to the author until too late for inclusion in the keys.

EVANIA.

Oriental Region.—*E. hirtipes* Kieffer; *peradeniyæ* Cam.; *interstitialis* Cam.; *hirsuta* Enderl.; *hirsuta* var. *rufofemorata* Enderl.; *setosa* Enderl.; *binghami* Cam.; *deesæensis* Cam.

Ethiopian Region.—*E. schönlandi* Cam. (allied to *Zeuxevania*); *meridionalis* Cam.; *fulvospina* Cam.; *peringueyi* Cam.; *rimosa* Enderl.

Neotropical.—*E. sancti-pauli* Kieff.

ACANTHINEVANIA.

Oriental.—*A. satanas* Enderl.; *simillima* Enderl.

Australian.—*A. meraŭkensis* Cam.

ZEUXEVANIA.

Oriental.—(*Parevania*) *rubra* Cam.; (*Parevania*) *semirufa* Kieff. See note below.

SEMÆOMYIA.

Brazilian Subregion.—*S. lüderwaldti* Enderl.; *lævis* Enderl.

The author has not had access to descriptions of the following species: *Evania coxalis* Kieff; *flabellata* Kieff.; *rufonotata* Kieff.; *parvula* Kieff; *tomentella* Kieff.; *canaliculata* Kieff.; *bicarinata* Kieff.; *carinigera* Kieff.; *beauforti* Cam. The last is probably an *Acanthinevania*, and said to be close to *A. meraŭkensis* Cam.

PAREVANIA Kieffer.

(Fig. 80.)

1906. *Parevania* Kieffer, Berl. Ent. Zeitschr., li, p. 270.

Type.—*Parevania semirufa* Kieffer.

Kieffer erects this genus for *P. semirufa* n. sp., which is either identical or very close to my *Zeuxevania schlettereri* described on page 179. About the only difference evident between this genus and the type of *Zeuxevania*—*Z. dinarica* Schletterer—is that the base of the free part of M is not entirely atrophied. For the present, at least, I should not incline to assign it more than subgeneric rank.

Evania rubra Cam. is a closely related, although distinct species. Cameron hesitates to place it in *Zeuxevania*, with which he admits its affinities, on account of its possessing the longitudinal sector of the base of the free part of M, which he states is absent in *Zeuxevania*, doubtless thinking of his *E. marginata*, which, however, really belongs to *Evaniscus* and not *Zeuxevania*.

FŒNINÆ.

I have recently recognized an additional genus of Fœninæ, resembling *Pseudofœnus* in wing venation, but occurring in California with one new species and in Guatemala. The description of this genus and species and of a new species of *Fœnus* from California, with additional observations on the classification of the subfamily, I shall shortly publish elsewhere.

EXPLANATION OF THE PLATES.

PLATE V.

1. *Hyptia prosetethetra* n. sp., sculpture on side of pronotum
2. *Hyptia hyptiogastris* n. sp., " " "
3. *Hyptia harpyoides* n. sp., " " "
4. *Hyptia nyctoides* n. sp., " " "
5. *Hyptia texana* n. sp., " " "
6. *Hyptia thoracica* Blanchard, " " "
7. *Hyptia reticulata* Say, " " "
8. *Hyptia mylacridomanes* n. sp., " " "

PLATE VI.

9. *Evaniella californica* Ashm., lateral view of head.
10. *Acanthinevania princeps* Westw., top view of head.
11. *Evaniella semæoda* n. sp., " "
12. *Hyptia harpyoides* n. sp., " "
13. *Evania appendigaster* L., " "
14. *Semæomyia kiefferi* n. sp., profile.
15. *Semæomyia kiefferi* n. sp., top view of head.
16. *Evaniella semæoda* n. sp., profile.
17. *Evania appendigaster* L., profile.
18. *Evania appendigaster* L.
19. *Hyptia*, thorax from in front, the head being removed.

PLATE VII.

20. *Hyptiogaster humeralis* Schl., labium.
21. *Hyptiogaster humeralis* Schl., maxillæ.
22. *Fœnus incertus* Cresson, labium.
23. *Fœnus incertus* Cresson, maxillæ.
24. *Odontaulacus editus* Cresson, labium.
25. *Odontaulacus bilobatus* Prov., maxillæ.
26. *Acanthinevania genalis* Schl., labium as seen from the side.

PLATE VIII.

27. *Evania appendigaster* L., maxilla.
28. *Evania appendigaster* L., labium, dorsal view.
29. *Evania appendigaster* L., " ventral view.
30. *Semæodogaster minuta* Ol., labium, ventral view.
31. *Semæodogaster minuta* Ol., maxilla.
32. *Zeuxevania schlettereri* n. sp., mouth-parts.
33. *Semæomyia barticensis* n. sp., labium.
34. *Semæomyia barticensis* n. sp., maxilla.
35. *Evaniella semæoda* n. sp., mouth-parts.
36. *Hyptia harpyoides* n. sp., maxilla.
37. *Hyptia harpyoides* n. sp., labium, ventral view.
38. *Hyptia harpyoides* n. sp., " dorsal view.

PLATE IX.

39. *Pammegischia ashmeadi* n. sp., posterior tarsal claw.
40. *Odontaulacus editus* Cr., " "
41. *Oleisoprister stigmaterus* Cr., " "
42. *Pristaulacus niger* Shuck., " "
43. *Fœnus incertus* Cr., " "
44. *Evania appendigaster* L., " "
45. *Evania urbana*, n. sp., " "
46. *Evania tinctipennis* Cam., " "
47. *Acanthinevania szepligeti* n. sp., " "
48. *Acanthinevania princeps* Westw., middle "
49. *Evaniella semæoda* n. sp., posterior "
50. *Zeuxevania schletterері* n. sp., " "
51. *Semæomyia barticensis* n. sp., " "
52. *Semæomyia kiefferi* n. sp., " "
53. *Semæodogaster minuta* Ol., " "
54. *Hyptia harpyoides* n. sp., " "

PLATE X.

55. *Semæomyia barticensis* n. sp., ♀, antenna.
56. *Evania appendigaster* L., ♀, "
57. *Hyptia harpyoides* n. sp., ♂, "
58. *Hyptia harpyoides* n. sp., ♀, "
59. *Evania enderleini* n. sp., ♀, "
60. *Evania appendigaster* L., posterior leg.
61. *Hyptia harpyoides* n. sp., " "
62. *Evania appendigaster* L., metanotum as viewed from the side.
63. *Hyptia* sp., metanotum as viewed from the side.
64. *Acanthinevania princeps* Westw., furcula.
65. *Evania enderleini* n. sp., "
66. *Evania urbana* n. sp., "

PLATE XI.

67. *Aulacinus fusiger* Schl., front wing (after Kieffer).
68. *Pammegischia ouelleti* Brad., front wing, abnormal, see text.
69. *Pammegischia ashmeadi* n. sp., front and hind wings.
70. *Interaulacus kiefferi* n. sp., front wing.

PLATE XII.

71. *Odontaulacus editus* Cr., front and hind wings.
72. *Hyptiogaster humeralis* Schl., front and hind wings.
73. *Fœnus incertus* Cr., front wing.
74. *Pseudofœnus pedunculatus* Schl., front wing.

PLATE XIII.

75. *Evania* sp., part of front wing.
76. *Evania appendigaster* L_t, front and hind wings.
77. *Evania urbana* n. sp., front wing.
78. *Evania enderleini* n. sp., front wing.

PLATE XIV.

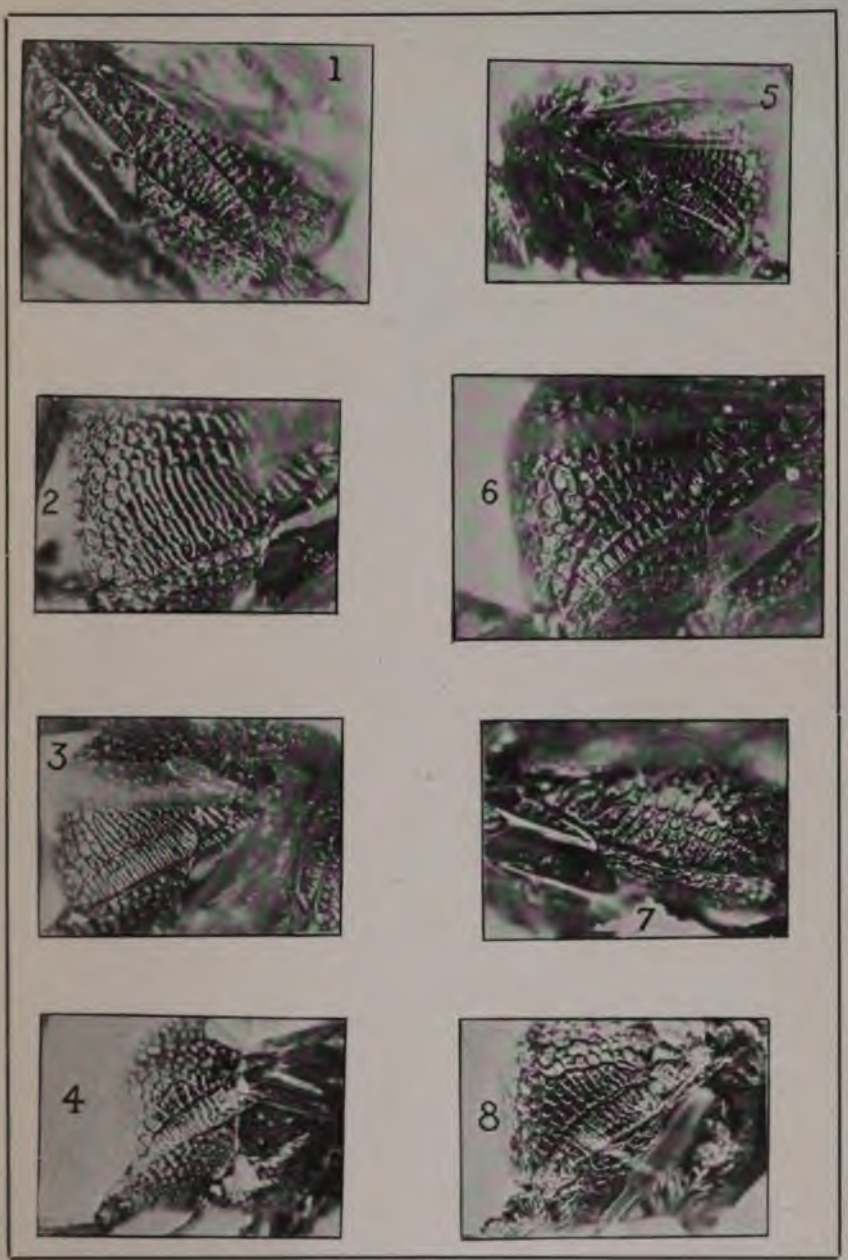
79. *Acanthinevania princeps* Westw., front wing.
80. *Zeuxevania* (*Parevania*) *schlettereri* n. sp., front wing.
81. *Zeuxevania dinarica* Schl., " (after Kieffer).
82. *Evaniscus marginatus* Cam., " (after Cameron)
83. *Evaniella neomexicana* Ashm., "

PLATE XV.

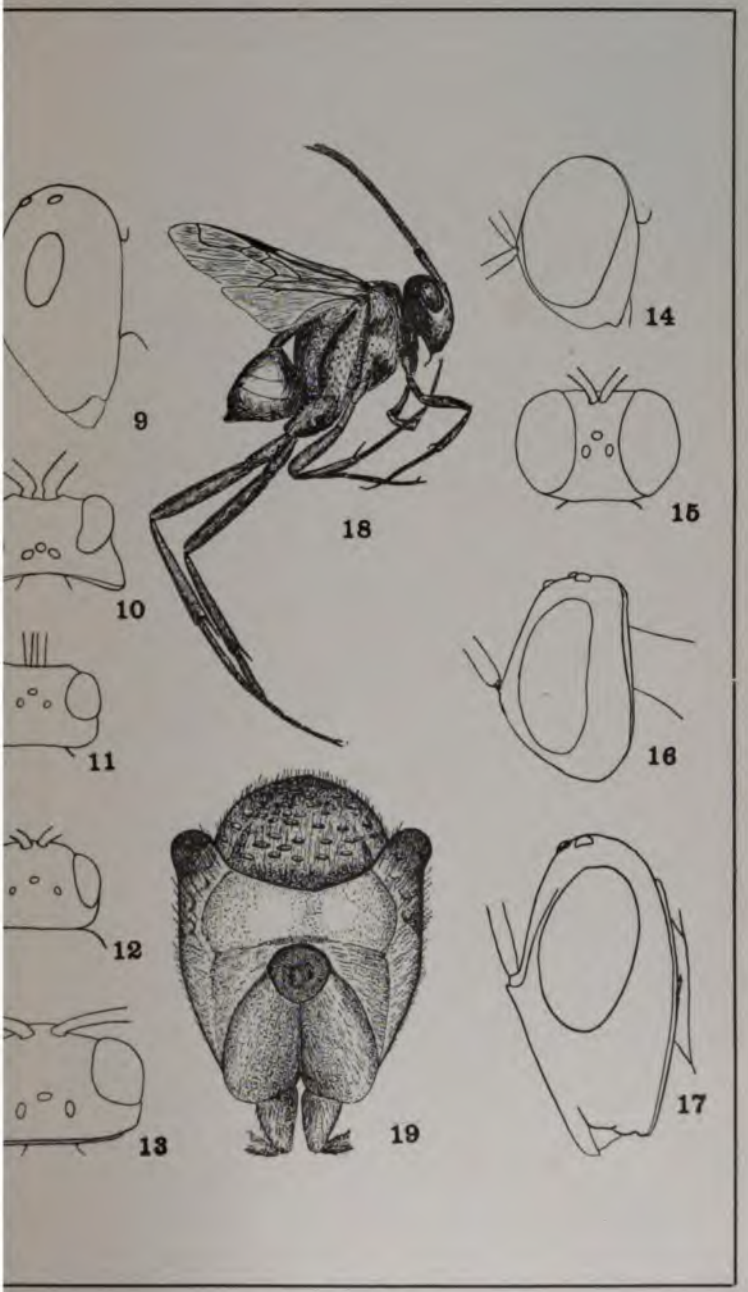
84. *Semævodogaster minuta* Ol., front wing.
85. *Semæomyia barticensis* n. sp., "
86. *Hyptia* sp., front and hind wings.
87. *Evaniellus* sp,. front wing (after Enderlein).

ERRATA.

Page 101, title, Read **ARCHAIC** for **ARCHIAC.**
" 109, 5th line, *Fœnus sericeum* Cameron for *F. maculicorne.*
" 133, 8th line, read Fœninæ for Gasteruptioninæ.
" 133, 29th and 34th lines, read m-cu for m cu.
" 136, 3rd column, 17th line, read ? 2^4 for ? 2^*.
" 137, 29th line, read *Ichneumon appendigaster* for *Evania appendigaster.*
" 163, 39th " " " " " " "
" 168, line 1 of table, read Argentine and Brazilian subregions.



BRADLEY ON EVANIIDÆ.



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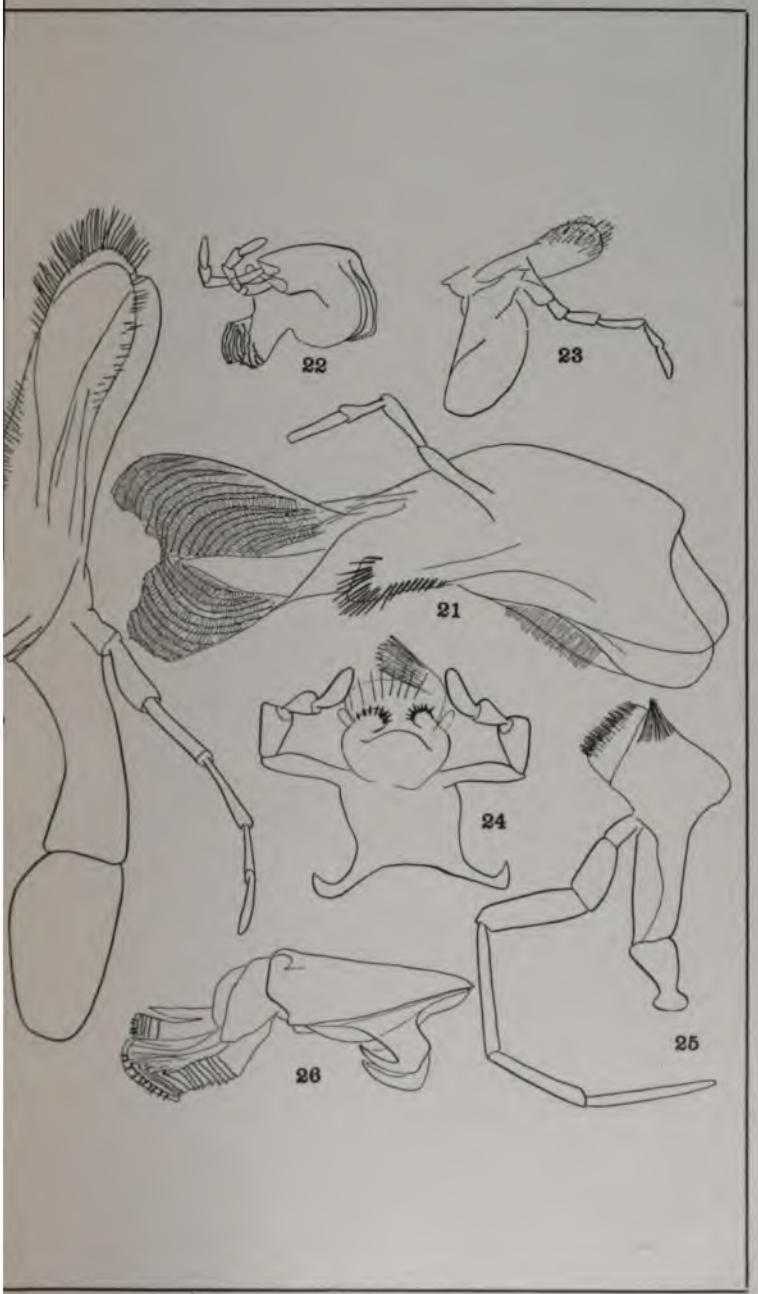

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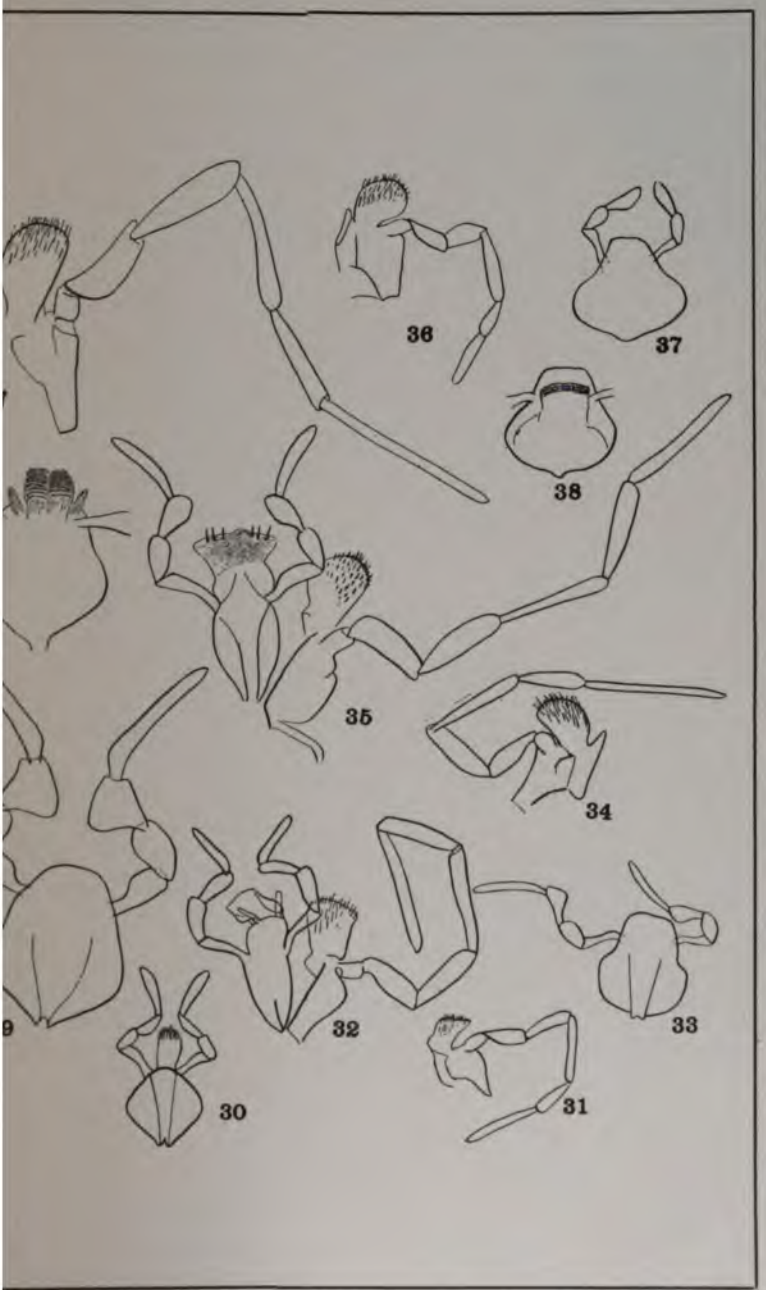

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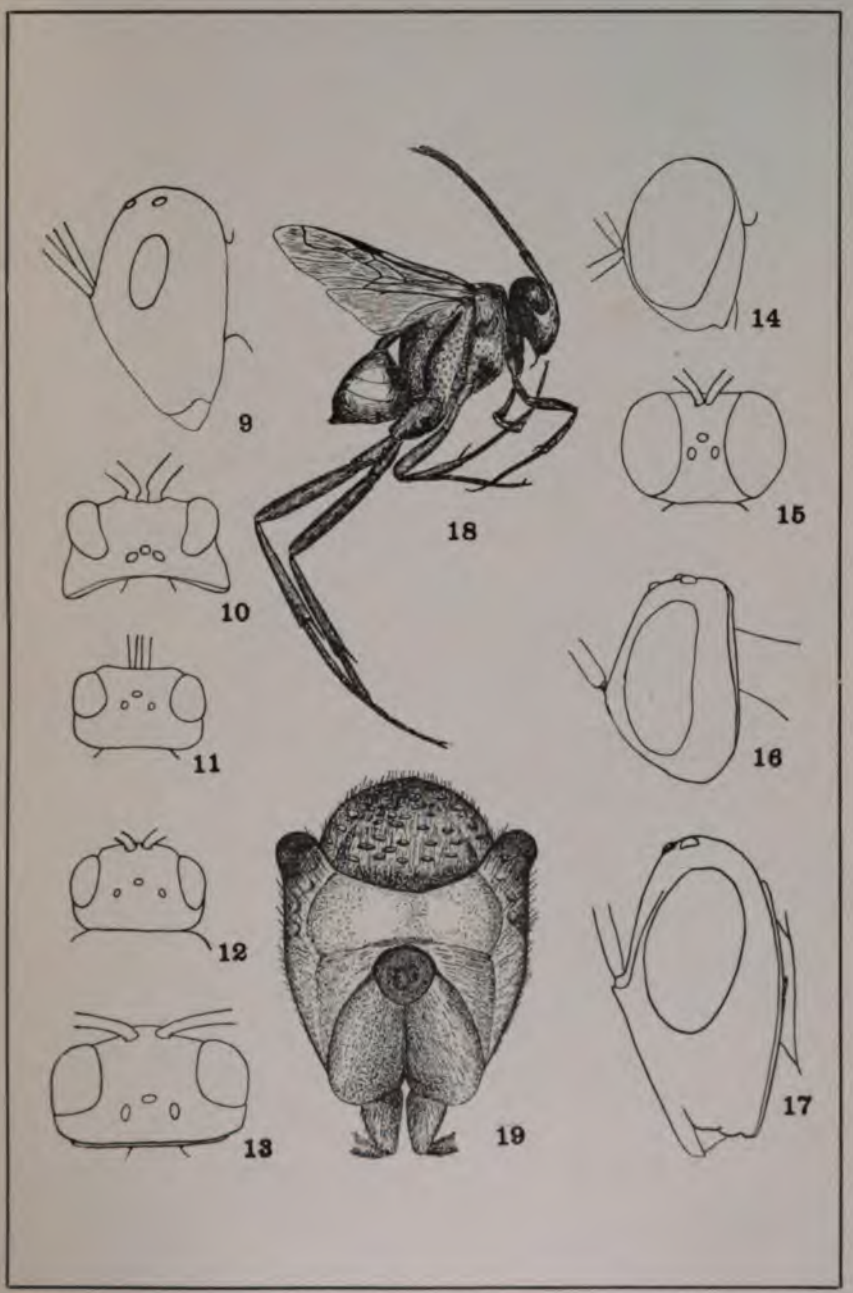

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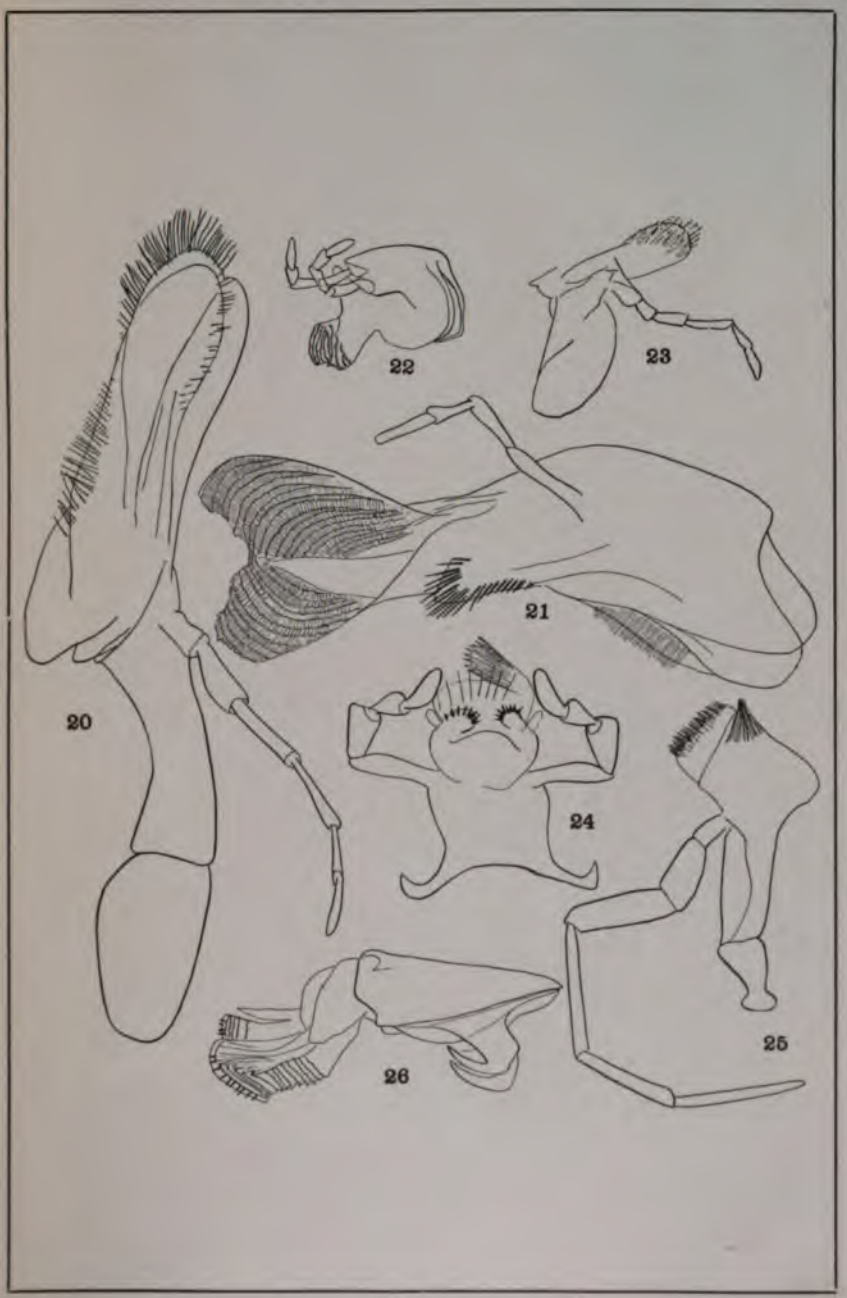

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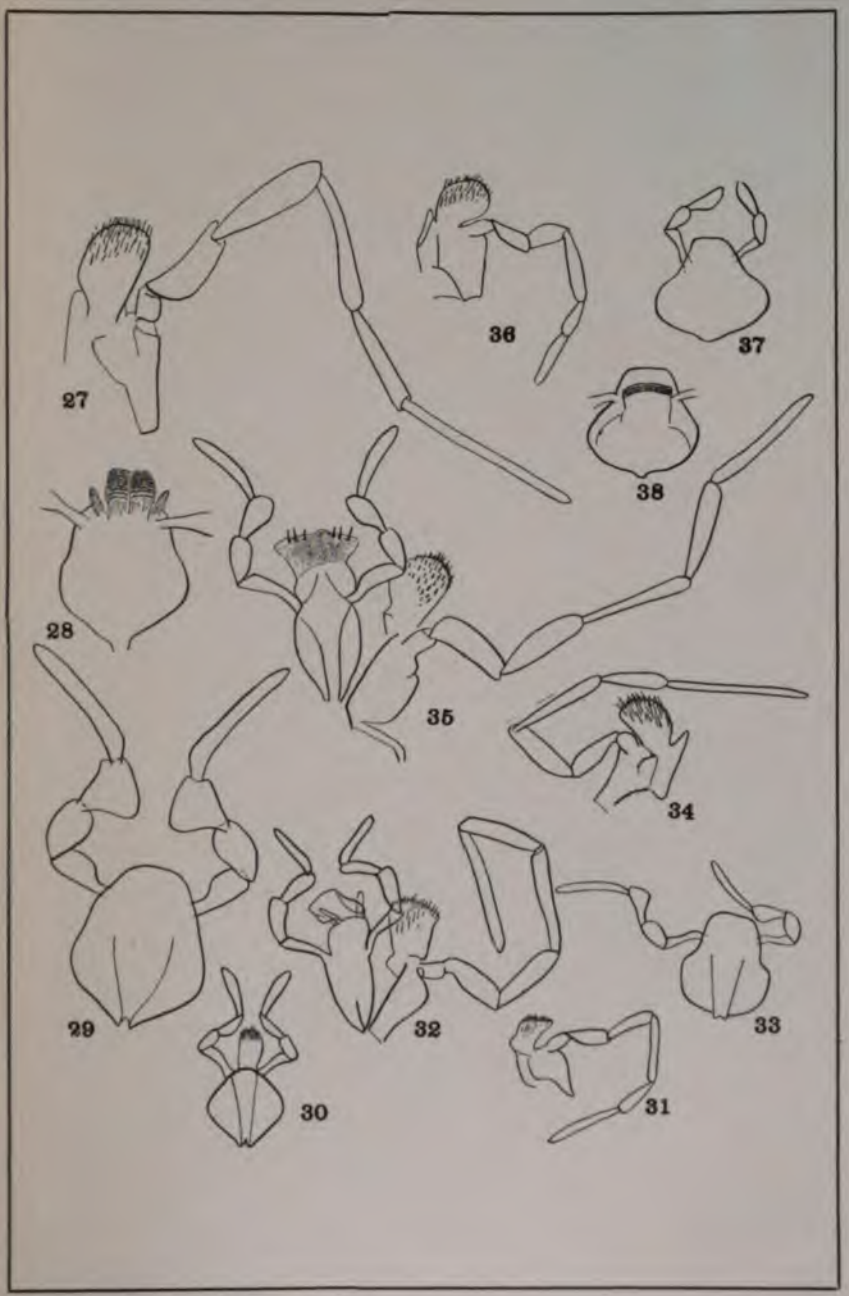

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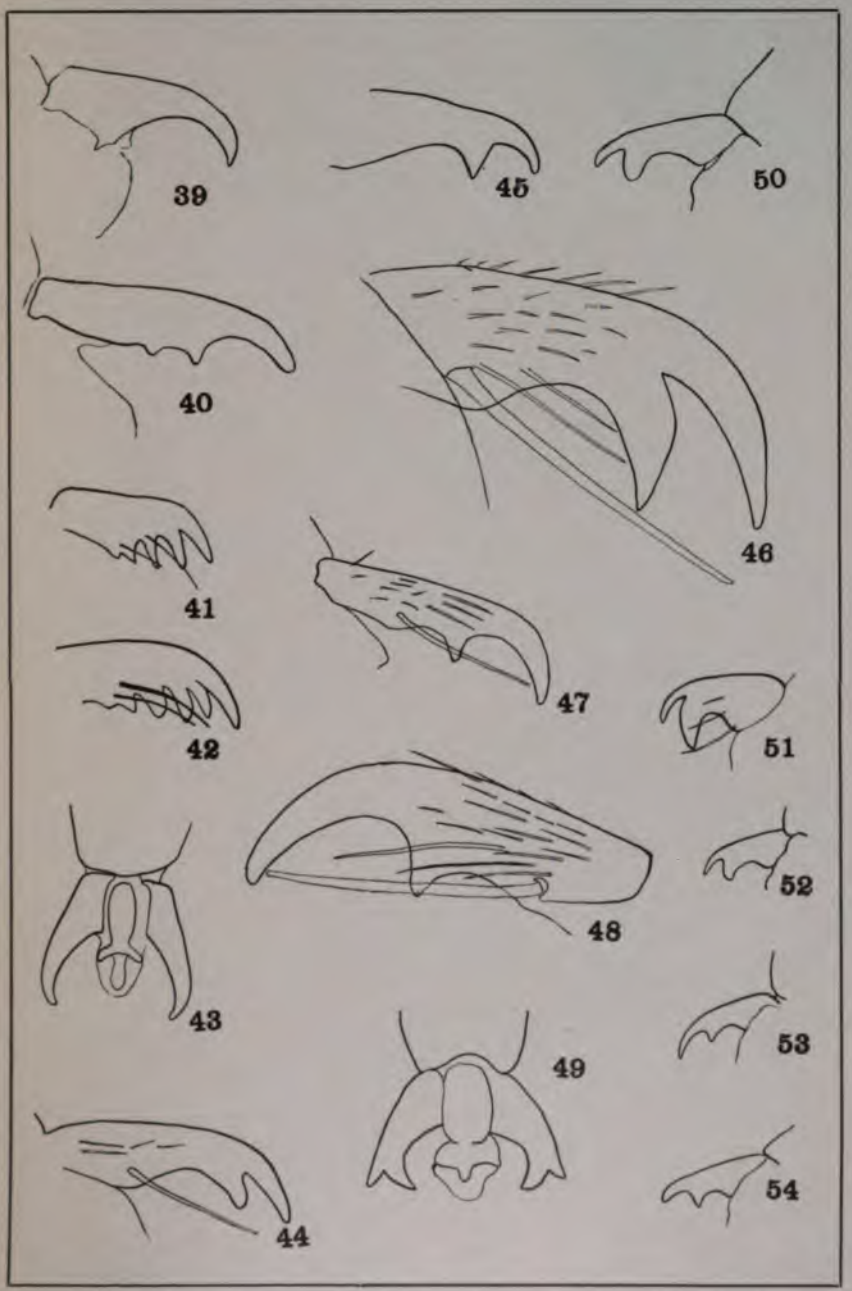

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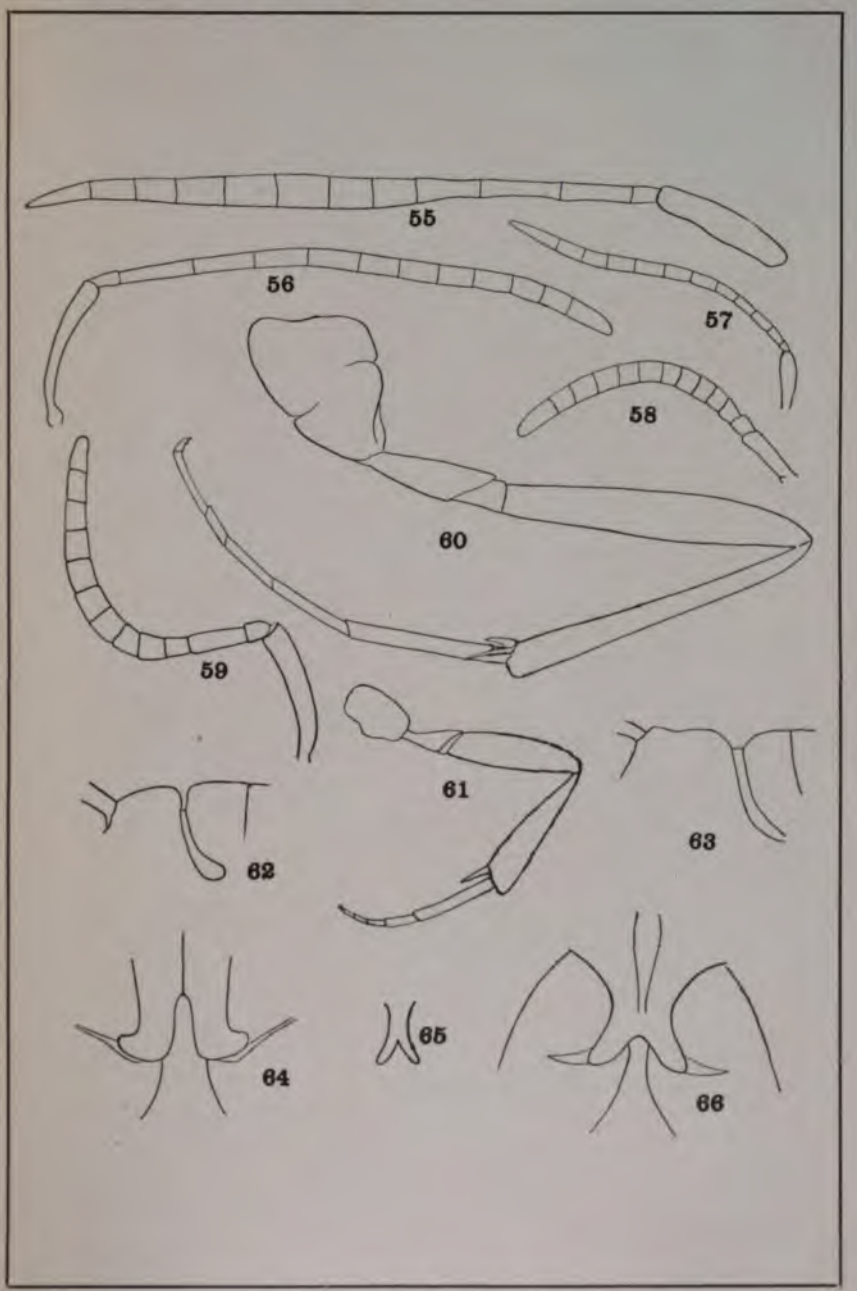
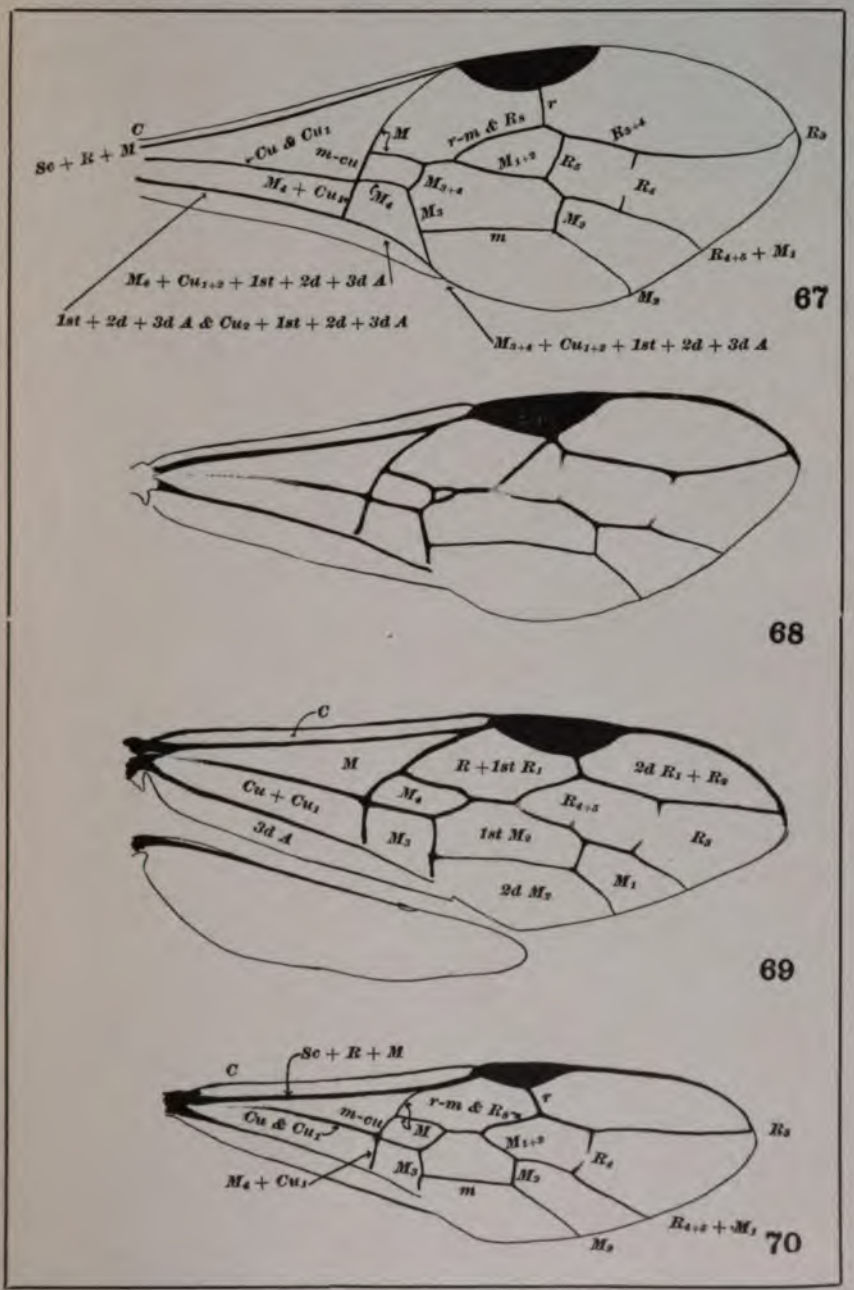


BRADLEY ON EVANIIDÆ.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M4 + Cu1
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M3+4
M3
M2
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R4+5 + M1
M4 + Cu1+2 + 1st + 2d + 3d A
1st + 2d + 3d A & Cu2 + 1st + 2d + 3d A
M3+4 + Cu1+2 + 1st + 2d + 3d A
M2
67
68
C
M
R + 1st R1
2d R1 + Rs
Cu + Cu1
M4
R4+5
3d A
M3
1st M2
Rs
2d M2
M1
69
Sc + R + M
C
r
r-m & Rs
m-cu
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R4+5 + M1
M2
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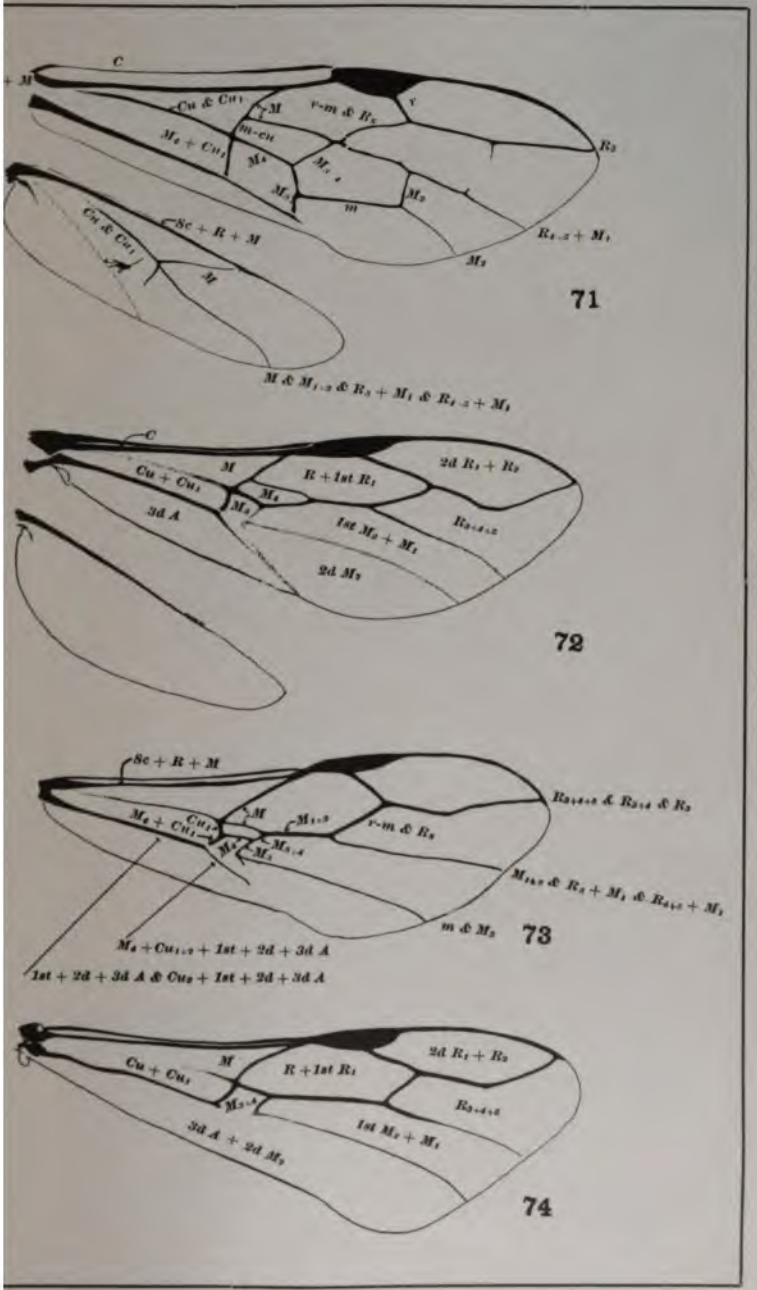

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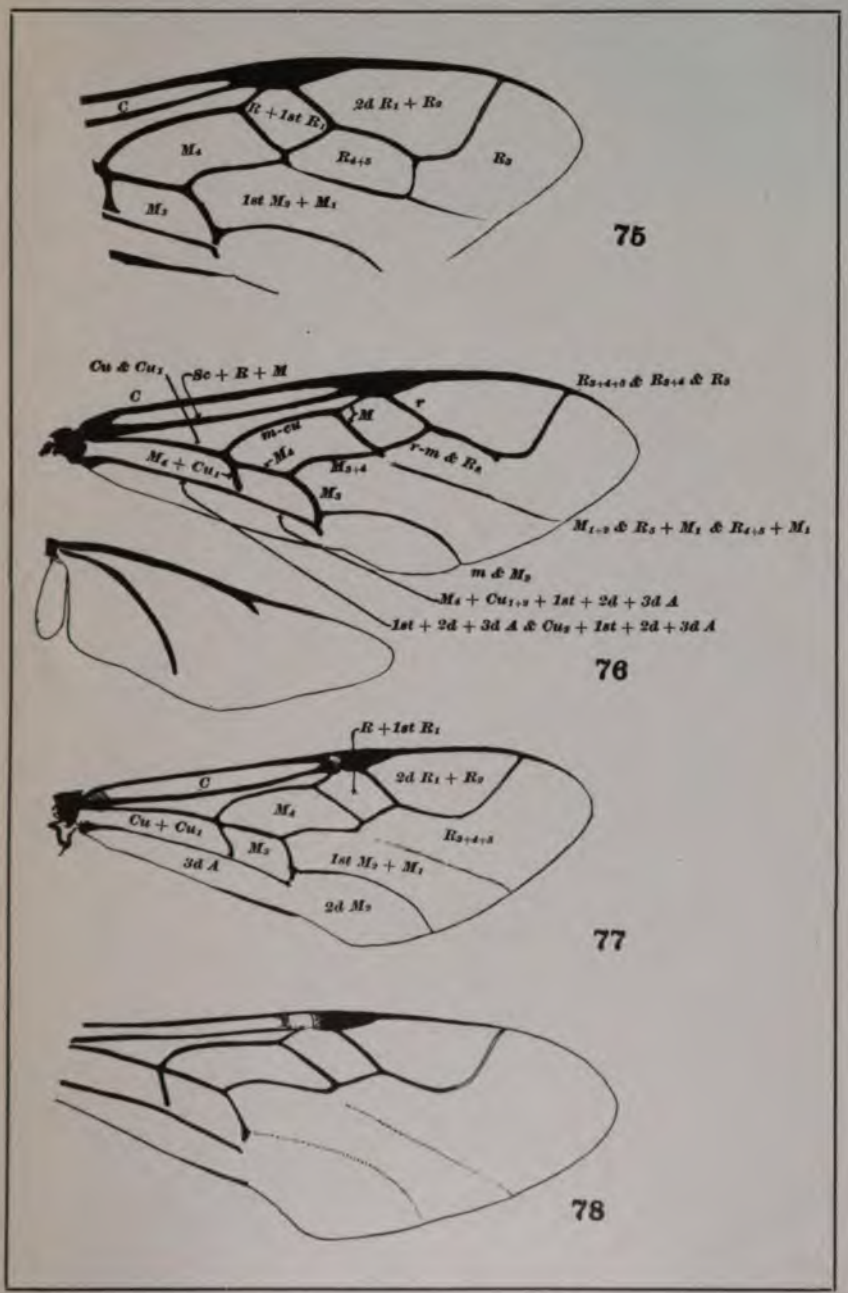

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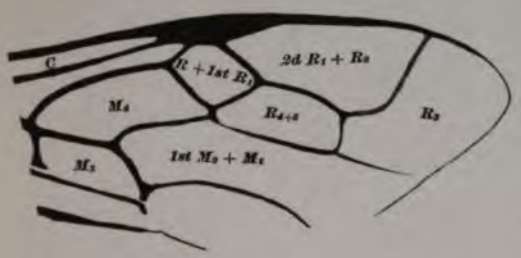

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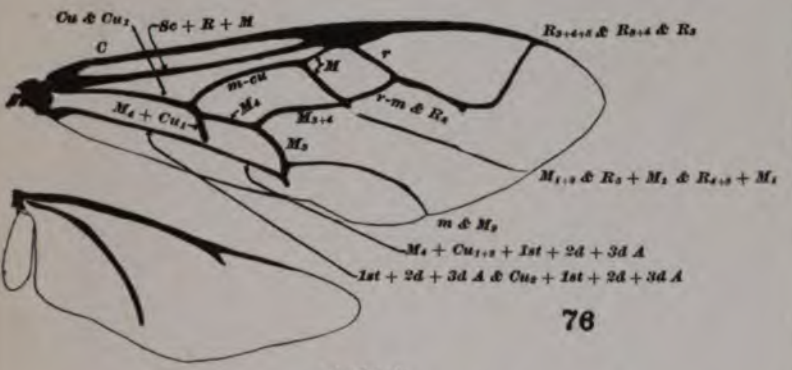

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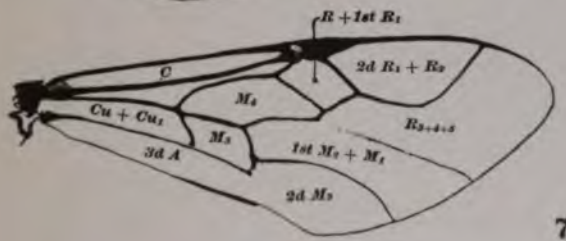

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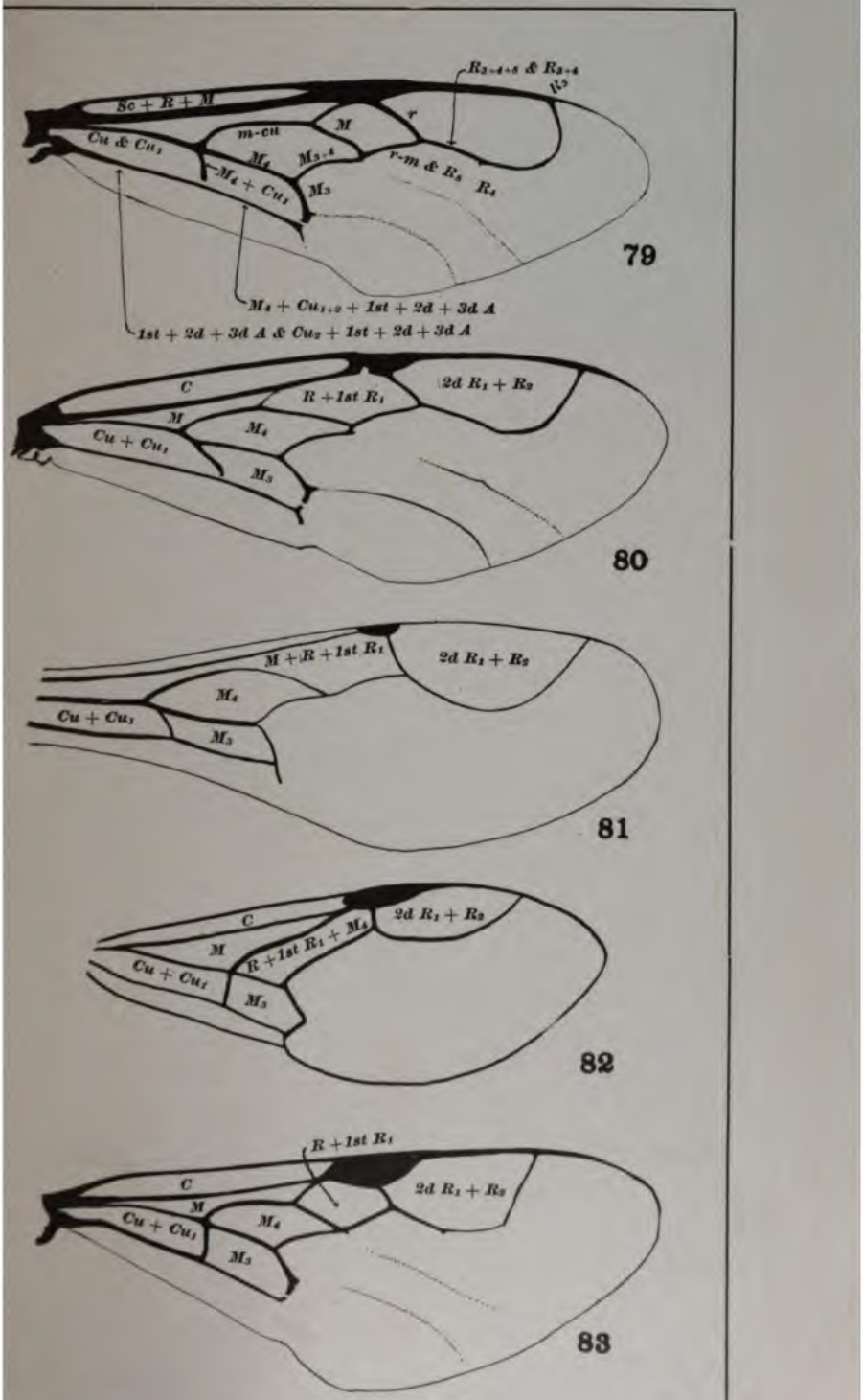

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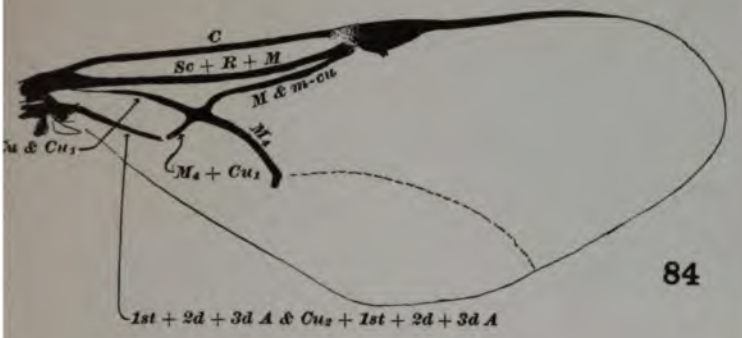
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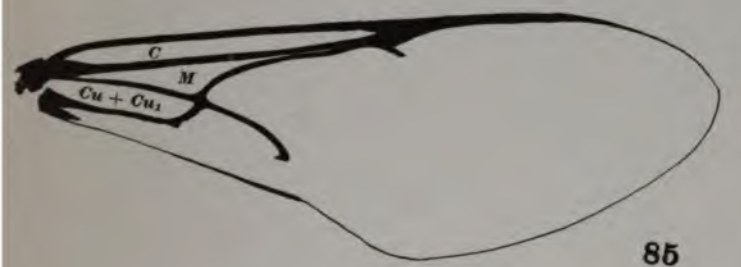
M4
u & Cu1
M4 + Cu1
1st + 2d + 3d A & Cu2 + 1st + 2d + 3d A

84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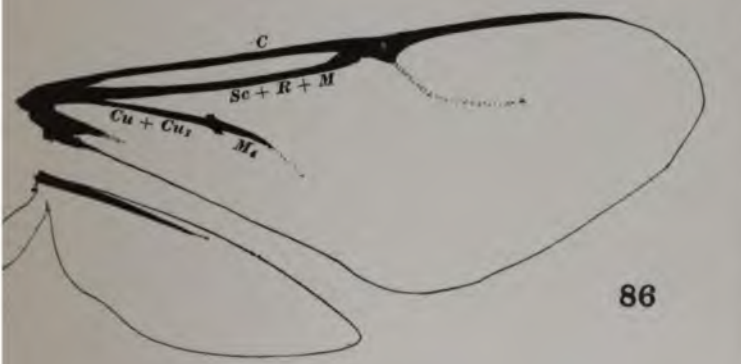
M
Cu + Cu1

85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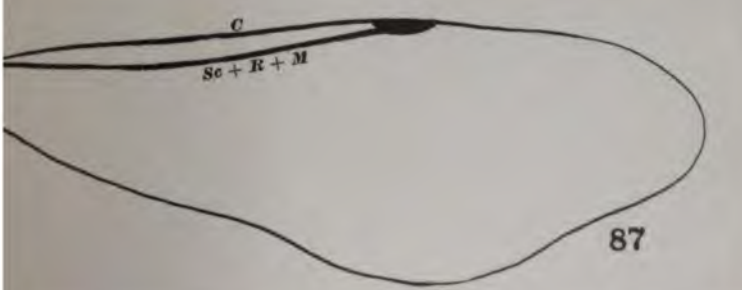
Cu + Cu1
M4

86


C
Sc + R + M

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PHILADELPHIA.

SUBSCRIPTION PRICE FOUR DOLLARS PER VOLUME.

A Contribution towards the knowledge of the Odynerida of the Southwest of the United States.

BY P. CAMERON.

The species recorded and described in this paper were sent me by Prof. C. F. Baker. The Vespidæ of Nevada, California and Texas are comparatively little known. In point of fact not much has been done towards the elucidation of the Solitary Wasps of the United States since the appearance of the well-known monograph of Dr. Henri de Saussure. I hope shortly to prepare and publish a synoptical table of the North American species.

Monobia quadridens Say.

Fedor, Texas.

A variable species as regards the size and form of the yellow markings.

Odynerus arvensis Sauss.

The four examples of this species examined are not alike. In none of them is the apex of the clypeus quite as shown by Saussure (Syn. Am. Wasps, f. 16*a*), but then its apex is not identical in Prof. Baker's specimens which are from Texas (Fedor). The black apical mark on the clypeus varies in size and form; it may be regular or irregular; the extreme apex may be black, red, or have two small yellow marks. The black apical mark on the first abdominal segment varies in size and form; in one specimen it is small, narrowed greatly at the base and apex, dilated laterally, the lateral projection being wide on the inner, gradually narrowed on the outerside. The legs are reddish or yellow, tinged with rufous. The head and thorax are densely covered with gray pubescence. In all the specimens there is a large yellow or rufous spot on the sides of the scutellum. Apical half of mandibles rufous, the black basal half with a yellow mark. There may be a small yellow lateral mark on the second abdominal segment.

Odynerus annulatus Say.

This is a most variable species as regards coloration; the sculpture varying also, some specimens being much more strongly punctured than others. Some specimens have the wings more deeply and broadly fuscous-violaceous than others. Other examples come

close in size and coloration to *O. dorsalis* Fab. Characteristic is the form of the clypeus, which is broader than usual, clearly broader than long; the apex broad, transverse, with the sides ending in minute teeth. It has been taken at Fedor, and Lee County, Texas; Oslar: Prescott, Phoenix and Congress, Arizona; Clear Creek and Berkeley, Colorado.

Odynerus crassus sp. nov.

Black; the clypeus, base of mandibles, underside of scape, a mark with a short pedicle below, gradually dilated from below upwards, the eye incision from the face to the end of the incision, a narrow transverse line on the base of the pronotum, postscutellum, the apical half of the first abdominal segment broadly on the sides, more narrowly on the apex, a large, transverse, oval mark on the sides of the second segment and the apices of the third to fifth more narrowly, lemon-yellow; the middle of mandibles, pronotum except at the base, tegulæ, the sides of metanotum and the sides of the first abdominal segment round the lateral yellow expansion—broadly on the inner side—and the legs, except at the coxæ, rufous. Wings hyaline, the costal and radial cellule smoky violaceous. ♂. Length (total) 11 mm.

Head above closely but not strongly punctured; the clypeus only sparsely punctured; the latter as wide as long, broadly rounded above, the apex with a deep, wide incision. The antennal hook long, reddish, reaching close to the base of the penultimate joint. Base of thorax transverse, the sides not distinctly projecting. Apical slope of postscutellum smooth, transverse; a deep striated furrow on the metanotum immediately below it. Sides of metanotum rounded, not margined, rugose. First abdominal segment cup-shaped, smooth; the other segments are closely punctured, the second less strongly than the others; its apex broadly depressed, the depression extending beyond the yellow line and is broader in the centre; the apex is slightly incurved, smooth, with a band of deep punctures behind, there being a similar band of larger and deeper punctures on the others. Coxæ black, the four anterior yellow below; the four anterior femora are yellow at the apex below; the hind coxæ and trochanters are black.

Fedor, Texas; August.

This species might be matched with one of the numerous varieties of *O. annulatus* Say; the incised apex of the clypeus readily separates the male from the latter, which has it not deeply incised, but transverse, with the sides slightly toothed.

Odynerus scudderi sp. nov.

Black; the sides of the clypeus broadly, a narrow line on the base of the mandibles, a mark over the antennæ, broader than long, transverse above, gradually roundly narrowed below, ending there in a nipple-like point, a line on the upper outer orbits, the line reaching to near the middle, a line on the base of thorax, narrowed in the middle, the sides rounded, a small irregular spot below the tegulæ, a small spot on the sides of the scutellum, and broad bands on the apices of the basal five abdominal segments, that on the first broadly narrowed in the middle; a complete band on the apex of the second ventral and triangular spots

on the sides of the following three segments, luteous. Wings bright fulvous, the apex tinged with fulvous; the costa and stigma bright rufo-fulvous, the nervures darker colored. ♀. Total length 10 mm.

Clypeus distinctly longer than wide; in its centre is a black mark extending from top to bottom, the top square, from there it becomes gradually widened to the middle, then gradually narrowed to near the apex, which ends in a clearly separated angle; the sides of the mark are irregular, the apex is transverse. Apex of postscutellum smooth, transverse. The sides of metanotum become gradually widened to a point in the middle from above and below; the apex is closely, finely, obliquely striated. Pro- and mesothorax rugosely punctured. Metapleuræ closely distinctly striated, the lower basal part more finely than the rest. First abdominal segment cup-shaped, smooth, as wide as the second, which is distinctly wider than long. The head, thorax and base of abdomen are densely covered with long, fuscous black hair. The base of the thorax is transverse, its sides not projecting.

This species shows an approach to *Hypodernus*.

Odynerus crotchii sp. nov.

Black; the clypeus, antennal scape, a line on the basal third of the pronotum, a narrow, more or less interrupted line on the upper edge of the pronotum, tegulæ, except for a brown spot in the middle, a large conical mark, obliquely truncated above, on the pleuræ below them, scutellum, a mark on the sides of postscutellum, an oblique, oval transverse spot on the sides of metanotum below, a line on the apex of the first abdominal segment above, one all round on the apex of the second, the upper line dilated laterally, the lower one broadly dilated in the centre, a line on the top of the fourth segment, the apex of the femora, the tibiæ and the tarsi, sulphur-yellow, the basal parts of the legs rufous. Wings highly iridescent, the front part and apex broadly violaceous, the nervures and stigma black. ♀. Total length 7 mm.

Head coarsely punctured, the clypeus with the punctures more widely separated, it is as long as wide, its apex ending in two stout teeth, the part between them being depressed. Thorax narrower than the head, its base margined, quite transverse, the sides of its apex broadly rounded, with a distinctly defined furrow down the centre, the sides below with two stout teeth, the upper broad. Base of postscutellum with a broad, raised, coarsely crenulated ridge, its apex bluntly rounded. First abdominal segment longer than it is wide at the apex, the base smooth, distinctly pedunculated, the rest coarsely, closely punctured; the second is more finely and more closely punctured, except at the apex, where there is a more strongly punctured belt, which is slightly depressed in the middle; the segment is longer than wide and is distinctly narrowed at the base.

The male is similarly colored, the clypeus yellow, with a semi-circular incision in the apex; the coloration is the same, except that the yellow markings are smaller and the legs are black to near the apex of the femora; the antennal scape is yellow below; the hook is short, narrow, not reaching to the base of the joint. The pubescence in both sexes is silvery.

Lee County, Texas; May.

Belongs to Saussure's Section B, *a*.

Odynerus (Pachyodynerus) cressoni sp. nov.

Black; a broad curved line, dilated above, on the top of the clypeus, an oblique mark, longer than wide, on the sides of the apex, a small squarish mark over the antennæ, a curved line, dilated on the innerside, on the eye incision, a short line on the top of the outer orbits, a line on the base of the pronotum, narrowed in the middle, a large mark, longer (counting from the top to the bottom), narrowed and transverse below; the postscutellum, sides of metanotum broadly, distinct bands on the apices of the basal five abdominal segments, that on the first dilated at the base and a semi-circular mark (its base transverse, the apex rounded) on the sides of the second segment, pale yellow, as are also the under side of the antennal scape; the extreme apex of the clypeus of the apical half of the mandibles rufous. Wings hyaline, tinged with fuscous violaceous; the radial cellule darker, distinctly violaceous. Legs bright rufo-fulvous, the coxæ, trochanters and base of femora black; the apex of femora and base of tibiæ largely yellow. ♀. Length to end of second segment 9 mm.

Closely punctured and covered with a gray pile; the apices of the basal three abdominal segments more strongly, deeply, irregularly punctured; the apex of the second strongly reflexed, depressed behind the raised part, the depression with yellow longitudinal keels, the part between them black; this depression behind is bordered by a band of yellow rugosities; the apex of the third is also reflexed but not so strongly, and is bordered with similar yellow rugosities. Apex of clypeus slightly depressed, transverse. Postscutellum raised, strongly punctured throughout; the apex of the yellow part is roundly curved. Sides of metanotum rounded; below projecting into longish oblique teeth. The second and third ventral segments have their apices yellow and are more strongly punctured than the rest. Base of thorax transverse, raised, slightly projecting on the outerside.

The black on the fore femora below extends beyond the middle, on the four hinder below closely to the middle. Tegulæ large, rufous, yellow at the base.

The coloration of the male is nearly the same, but with the yellow much more extended; the clypeus is yellow; the mark on the front is larger, longer and roundly bifurcated above; the eye incision is broadly yellow; the mandibles are yellow at the base and below, except at the apex where they are rufous; the femora and trochanters want the black; the coxæ are yellow below; the tibiæ and base of tarsi are largely yellow in front. The flagellum of antennæ is rufous, except on the top. Tegulæ yellow, with a rufous spot in the middle.

The apex of clypeus has a triangular incision; the clypeus is shining and sparsely punctured. The antennal hook is broad, black and bluntly rounded at the apex; it is larger and broader than usual. The hind tibiæ are peculiarly formed; they have the lower edge at the apex roundly, broadly dilated, this dilated part being clearly separated. The spot on the second abdominal segment is larger, more irregular and obliquely oval; the yellow line on the first segment is largely dilated backwards laterally; the line on it broader and dilated in the middle; it has the same depression and rugosities as has also the third, but not so strongly developed; the three apical lines are almost white. Also the yellow on the postscutellum projects into the dilated part behind, it being consequently not quite transverse as in the ♀.

Oslar: Las Vegas, New Mexico; July. Allied to *O. toas* Cress. Characteristic is the dilated apex of the ♂ hinder tibiæ.

Odynerus (Pachyodernus) oslarensis sp. nov.

Black, densely covered with a short pale pile, the pile on the top of the mesonotum tinged with fulvous; a small spot on the outer orbits near the top, two short lines on the hinder edge of the pronotum, an irregular, more or less interrupted line on the centre of the postscutellum, a moderately broad line on the apex of the basal two abdominal segments, and a narrower, less distinct one on the apex of the third, bright orange-yellow; the markings on the thorax paler than those on the abdomen. Legs densely covered with a pale pile. Wings obscured hyaline, fuscous violaceous in front, the nervures and stigma black. ♀. Length to end of second segment nearly 10 mm.

Clypeus clearly longer than its greatest width; the apex depressed, projecting, slightly roundly incised, its sides thickened; the punctuation is strong, close and uniform; the punctuation of the front and vertex is coarser, closer and more rugose; there is a smooth, shining, triangular tubercle, furrowed in the middle, between and shortly above the antennæ. Thorax transverse at the base and apex, strongly closely punctured, the base of metapleuræ smooth, the rest irregularly, obliquely striated. The two furrows on the apex of the mesonotum are distinct, but not deep. Postscutellum clearly separated by a furrow behind; it is raised, rounded, coarsely rugosely punctured, its apical slope smooth, shining, transverse. Metanotum irregularly shagreened, more strongly and obliquely above; in the middle above is a small, smooth, shining triangular area; from its centre and sides a keel runs down to near the middle, the part below them being smooth, flat and slightly raised; the sides at the angle above the middle project into three teeth, of which the central is the larger. The first abdominal segment is weakly, the base of the second more strongly, its apex still more strongly and the third to fifth coarsely rugosely punctured.

Oslar: Congress, Arizona.

In Saussure's arrangement this species would come near *O. californicus*.

Odynerus (Hypodernus) longipilosus sp. nov.

Black; an irregular ovate mark on the sides of the clypeus above; a small transverse oval mark over the antennæ, a minute one behind the top of the eyes, a line on the base of the thorax, the base and apex of tegulæ, a small irregular mark below the latter, and narrow but distinct lines on the apices of the basal four abdominal segments, the apical two narrower than the others, white, very slightly tinged with yellow; the greater part of the tibiæ pale yellow, the tarsi rufous. Wings hyaline, distinctly tinged with fulvous in front; the costa and stigma rufo-fulvous. ♀. Length 12 mm.

Head, thorax and base of abdomen densely covered with long fuscous hair. Clypeus pyriform, as broad as long, its apex somewhat broad, almost transverse, distinctly punctured; the rest of the head and the thorax closely, strongly punctured. Thorax fully twice longer than wide, its base not quite transverse, the sides not projecting; the apex with the sides blunt. Parapsidal furrows indicated weakly in the middle; the middle of mesonotum broadly depressed at apex. Apex of post-scutellum transverse, aciculated. Base of first abdominal segment smooth and shining below, rougher above, the suture not prominent; the segment above is bluntly rounded; the second segment square, finely minutely punctured; the apices of the segments are flat.

Golden, Colorado; San Miguel, Colorado (Oslar).

Except that the base of the first abdominal segment above is roughened, showing an approach to *Ancistrocerus*, this species agrees fairly well with *Hypodernus*, which section is rare in the Nearctic region. It is more slenderly built than the typical forms of that group. The sides of the metanotum being margined (but not very strongly), may cause one to refer it to Saussure's Section 1 of *Ancistrocerus*, with the rugosity on the top of the first abdominal segment.

The group of **fedorensis** Cam. (*rufinodis* Cress.).

This is a group of small-sized species, with the greater part of the median segment, the basal segment of abdomen and the legs red.

NOTE.—There does not appear to be any clear line of demarcation between *Odynerus s. str.* and *Ancistrocerus*. The suture may be distinct or merely indicated by the basal slope not being so strongly punctured as the rest.

The grouping of the species may be regarded as my first attempt to range the species according to their natural affinities.

Odynerus fedorensis sp. nov.

Black, the median segment, first abdominal segment and the legs red; the clypeus, basal half of mandibles, a mark roundly dilated laterally above, underside of antennal scape, a broad, interrupted line on the pronotum, a broad curved line across the apex of the scutellum, base, apex and outerside of the tegulæ, a large mark, transverse above, rounded below, on the mesopleuræ below the tegulæ, a band on the first and second abdominal segments, that on the second all round, and a large, irregularly rounded mark on the sides of the second abdominal segment, yellow; the tarsi are blackish; there is a yellow mark on the apex of the fore femora behind, and the four anterior tibiæ are yellow in front. Wings hyaline, the radial cellule smoky, the stigma and nervures fuscous. ♂. Length to end of second abdominal segment 6 mm.

First abdominal segment cup-shaped, except at the base, closely strongly punctured; the apex distinctly curled up and more strongly punctured; the second segment is closely punctured, more strongly towards the apex, which is more strongly reflexed than the first, its base clearly narrowed. Clypeus broader than long, obliquely narrowed laterally above, coarsely, closely punctured; its apex is shortly, bluntly bidentate; deeply depressed above. Head above closely strongly punctured; the eye incision thickly covered with silvery pubescence; the space between the hinder ocelli is depressed; occiput transverse, the temples are longer than the eyes above; there is a small yellow spot on them above. Base of thorax transverse, the lateral angles acute. Apex of postscutellum transverse, the apical slope smooth. Apex of metanotum not much excavated, furrowed down the middle; the centre and outer edges punctured, the rest smooth; below, on the sides, is a longish sharp spine. Antennæ stout; the apical hook does not reach to the apex of the last joint. The middle of the mandibles is red. Palpi blackish, as are also the anterior coxæ and trochanters.

Fedor, Texas. This is an *Odynerus* sensu str.

It is possible that this may be the ♂ of *O. rufinodus* Cress. from New Mexico; there are some essential differences, however, not of a sexual[1] nature; e. g. *rufinodus*, according to the description, has no marks on the second abdominal segment, no mark on front, the scutellum has two spots, not a continuous line, the posterior tarsi only are dusky, and the fore legs are red at the base. The systematic position of *O. rufinodus* is not stated, but presumedly it is an *Odynerus* sensu str.

Odynerus heterospilus sp. nov.

Black, the pronotum, postscutellum, median segment, first abdominal segment, underside of second broadly in the middle, apex of clypeus and greater part of mandibles red; yellow are a spot on front, the inner portion of the eye orbits, a small spot on the outer orbits near the top, the centre and outer edge of pronotum, greater part of tegulæ, a broad line on apex of scutellum, the apex of the first abdominal segment above, the second more broadly, the line at the sides above directed broadly, obliquely backwards and below on to the sides to the red central line, the apex of the fourth segment broadly yellow in the middle above. Except at the base, the four front legs are red; the fore femora are marked with yellow at the apex; the apical half of hinder femora red; the middle tibiæ and tarsi are darker colored. Wings almost hyaline, the radial cellule fuscous violaceous, the nervures and stigma black. ♀. Length to end of second abdominal segment 5 mm.

Eye incision, face and clypeus densely covered with silvery pubescence. Head strongly, closely punctured. The front and vertex sparsely covered with short, white pubescence. Clypeus broader than long, rounded above; its apex incised, the sides of the incision forming sharp, triangular teeth; not much depressed above. Base of thorax not quite transverse, the centre slightly retreating. Apex of postscutellum roundly dilated. First abdominal segment large, cup-shaped; a slight depression in its middle at the apex; the second is not so strongly punctured as it; it is longer than usual compared with the breadth; the apices of the segments are not reflexed. The flagellum of antennæ reddish-brown below.

Fedor, Texas.

This species is probably variable as regards the amount of red it bears; the red may be absent from the clypeus, on round the edges on the prothorax, on the sides only of the median segment, and the red on the first abdominal segment may be marked with black.

The three little species of this coloration should be separated thus:

a. First and second abdominal segments reflexed.
Second abdominal segment immaculate, no mark on front.
rufinodus Cress.
Second abdominal segment with a yellow mark on the base; front maculate.
fedorensis.

b. First and second abdominal segments not reflexed (the postscutellum rufous; the line on the apex of second abdominal segment dilated obliquely backwards in the middle, the prothorax marked with rufous).
heterospilus.

The group of **chelonogaster** Cam.

This forms a well marked group from the form of the second abdominal segment, which is longer than usual, and has the sides and apex margined by a projecting brim; characteristic, too, is the raised apical margin of the basal two segments, the raised part being narrowed in the centre. The apical segments are hid under the large second and are minute. The median segment and the legs are bright red.

Odynerus chelonogastrus sp. nov.

Black, densely pruinose, the pile giving it a whitish appearance; the apical two-thirds of the clypeus broadly in the middle, mandibles, underside of antennal scape, the greater part of the metanotum, the metapleuræ except round the top and apex and almost the basal two-thirds of the first abdominal segment red; the upper half of the sides of clypeus (the base above is black in the centre), a large mark in the eye incision, a short line on the upper outer orbits, the apex of the pronotum, a triangular mark on the sides of the apex of scutellum, the apical half of postscutellum, the base and apex of tegulæ (their centre red), a pyriform mark on the pleuræ below the tegulæ, a line on the apex of first abdominal segment, its centre with two rounded dilatations, the part between being rounded and narrowed on the innerside; laterally the line is continued backwards to the red base; there is a broader line on the apex of the second segment, with a rounded incision in the middle, the line laterally continued near to the apex of the basal third, where it is broadened and is shortly prolonged towards the centre of the segment. Legs red, the tarsi black; the tibiæ with a white line on the outerside. Wings hyaline, the nervures and stigma black. Flagellum of antennæ brownish-red below. ♀. Length to end of second abdominal segment 8 mm.

Head closely punctured, covered with silvery pile; the clypeus broader than long, less closely punctured than the front; its apex has a rounded incision. Base of thorax transverse, the sides not projecting. Postscutellum large, its apex broadly rounded, as are also the sides of median segment.

Oslar: Jerome, Arizona.

This is a peculiar species as regards the form of the basal two abdominal segments; the white apex of the first abdominal segment is roundly raised—broadly, not curled up as with many species—with a rounded depression between the dilated central part; the apex of the second is similarly but not so distinctly raised and with a transverse furrow at the apex of the incision; beyond the white border there is a thin raised margin, which is continued backwards along the lower edge of the segment to near its base; the

second is nearly twice longer than wide; the apical segments are curled up under the second, the whole abdomen reminding one of the Braconid genus *Chelonus*.

The group of Ancistrocerus nigro-hirsutus.

Large fulvo-rufous species, marked with black and yellow, densely haired, the front and vertex black in the centre, bordered by rufous lines; the antennæ black, broadly rufous at the base; clypeus ending in two small teeth; apex of second abdominal segment strongly curled up. Metanotum angled laterally and margined round the top (*nigro-hirsutus*) or broadly rounded laterally, without keels above (*tuberculiceps*). A distinct group.

Ancistrocerus ? nigro-hirsutus sp. nov.

Length to end of second abdominal segment 13 mm.

Black, densely covered with long black pubescence; the clypeus, apex of first abdominal segment narrowly, almost the apical half of the second and the whole of the others pale lemon-yellow; red are a broad line on the inner eye orbits commencing at the clypeus, extending above to behind the ocelli, where they almost unite behind; the outer orbits broadly, the line gradually narrowed above and below, above extending on to the hinder edge of the vertex, the prothorax broadly above, a small mark on the mesonotum behind the middle, the greater part of the scutellums, a mark twice longer than wide and of equal width, a mark on the outerside of the base of the metanotum, a broad band on the first abdominal segment between the broad black base and the narrow yellow apex, and the centre of the second segment, the base having a narrow black band. Basal two or three joints of the antennæ red. Legs rufous; the coxæ, trochanters and base of femora before and behind black. Wings fuscous-violaceous, the base broadly fulvous; the costa and stigma dark testaceous. ♀.

Clypeus, if anything, broader than long, gradually, obliquely narrowed from the eyes to the apex, which ends in two shining blunt teeth; strongly punctured and covered with black hairs. Front and vertex strongly, closely punctured; there is a flat depression behind the hinder ocelli; behind them are two small shining tubercles. The head is more densely covered with black hair than the thorax. Thorax strongly punctured; its base transverse, the lateral angles slightly projecting. There is a narrow furrow or impressed line down the middle of the scutellum. Postscutellum broadly roundly narrowed behind; the apical slope smooth. Base of metanotum behind the keel closely punctured, the rest weakly punctured, striated towards the apex; there are two rounded keels on the top of metanotum; there is a smooth shining line down the centre. First abdominal segment cup-shaped; the apex more strongly punctured than the rest, with the apical margin curled up slightly; the apex of the second is strongly reflexed; the part behind the margin is broadly depressed, the part behind the depression being more distinctly and broadly raised on either side of the middle than elsewhere. The second segment is distinctly longer than wide; below, at the base, it projects distinctly below the first; the punctuation on the third and following segments is close and strong, but becomes weaker towards the apex.

This species has the general coloration of *A. tuberculiceps*, the chief difference being that there is a spot, not two lines, on the mesonotum, only one mark on the mesopleuræ, and that the frontal lines unite behind the ocelli; the body is densely haired, the hair being black, not gray; structurally it differs in having the top of the metanotum margined by rounded keels, the sides being bordered by weaker keels; it is a larger species and the centre of the second abdominal segment is roundly, broadly tuberculate; the suture on the base of the abdomen is weak. ♀.

Boulder, Colorado.

Belongs to Saussure's Section 1, Syn. of Am. Wasps, p. 159.

Odynerus tuberculiceps Sauss.

What agrees fairly well with the above Mexican species has been taken at Oslar, Las Vegas, New Mexico. The only difference which I can make out, without a type, is that the red line round the inner orbits is interrupted by a black oblique one which runs from the black on the vertex to the inner top of the eyes (judging by Saussure's figure on Pl. XVI, f. 9, 10*a*), but according to the description in Syn. of Am. Wasps, 185, the line is interrupted "at the summit." The frontal red line on the Las Vegas specimen commences at the top of the eye incision, is broad, has two incisions on the innerside, is narrowed and roundly curved at the top towards the tubercle. There are three red spots on the mesopleuræ, a large wide irregularly oval basal one, followed by a much narrower, more oblique one, sharply pointed above, broader and more rounded below, these two running from above downwards; below them is a line of about the same size as the apical one, but running from the base to the apex of the pleuræ. In having the body densely covered with gray pubescence, in having a shining tubercle above the ocelli, in the front ocelli being the larger, in the apex of the clypeus being shortly bluntly bidentate, and in the general coloration it agrees with the figure and descriptions of *tuberculiceps*.

The group of Ancistrocerus lineativentris Cam.

Black, the lighter markings bright sulphur-yellow; the basal two abdominal segments with large black marks at the base, the marks roundly broadly, or narrowly and deeply incised laterally. The body densely haired; the sides of pronotum projecting or not.

To this group might be referred *auranus* Cam. if it were not that

there is no trace of a suture on the first abdominal segment. Also *cytainus* Cam. It appears to be a group characteristic of California and the southwest; *O. sulphureus* Sauss. may be taken as the type.

a.—Lateral angles of pronotum distinctly projecting.

To this section belong *lineativentris* Cam. and *sutteranus* Sauss.

b.—Lateral angles of pronotum not projecting, rounded.

To this section belong *O. cytainus* Cam., *O. visellus* Cam. and *O. auranus* Cam., having the same coloration and arrangement of abdominal black markings, but they appear to belong to *Odynerus* s. str. As a matter of fact, it is difficult, with these insects, to find a hard and fast line between *Odynerus* and *Ancistrocerus*.

A. spilogaster Cam. merely differs in the yellow spot on the second abdominal segment being enclosed all round. It has the projecting pronotal angles of *sutteranus*. *A. claremontensis* Cam. has also the spot enclosed. *Pachyodernus cosmiogaster* Cam. has, except as regards the absence of the abdominal suture, the characteristic of the group.

Ancistrocerus fulvitarsis sp. nov.

Black; the sides of clypeus broadly on the upper half, a small roundish mark over the antennæ, a short, sharply-pointed line on the base of mandibles, a short line on the upper outer orbits above, a line on the base of pronotum, not extending laterally beyond the basal third, base and apex of tegulæ, two large marks on the scutellums, an oval mark on the pleuræ below the tegulæ, the apex of the first abdominal segment broadly, the line dilated broadly backwards on the sides to the top of the apical slope, the apex of the second broadly, this line dilated behind into an irregular triangular incision, its outer basal half being irregularly bordered with black; the apices of the third, fourth and fifth broadly, two small marks in the middle of the sixth, the second ventral segment except for a broad curved irregular mark on the sides, united to a broad transverse one at the base, the apex of this being broadly rounded and ending in a short reversed T-shaped mark and a broad curved line on the apices of the others, bright sulphur-yellow, except the last which is entirely black. The apices of the femora narrowly and the tibiæ sulphur-yellow; the tarsi rufous-fulvous. Wings hyaline, tinged with fulvous at the base, the apex with fuscous; the stigma dark testaceous. ♀. Total length 11 mm.

Head, thorax and base of abdomen thickly covered with fuscous pubescence. Head, prothorax and mesothorax closely, strongly punctured; the metanotum and lower part of metapleuræ aciculated. Clypeus as wide as long, rounded above, the narrowed apex depressed, smooth; it is not quite transverse, having a slight curve; the clypeus is somewhat strongly punctured, more or less strigose towards the apex. The centre of the mesonotum is depressed in the middle at the apex, the depression bordered by two longitudinal furrows. Metanotum finely obliquely striated; the upper, outer part bordered by a curved keel, the keel continued, but not distinctly down the sides. Base of postscu-

tellum raised, strongly rugosely punctured; the apex aciculated, transverse. The first abdominal segment cup-shaped; the basal slope smooth; the rest punctured, strongly towards the apex which has a smooth border, behind which is a row of strong punctures. The second segment is as wide as long, strongly, closely punctured; its apex is not reflexed; the other segments are closely punctured. Base of thorax transverse, the sides rounded.

Santa Clara Co., California (Baker).

A broad, stout species, with the head, thorax and base of abdomen thickly covered with long pale fuscous hair.

This species looks like *A. lineativentris* Cam., which may be known from it by the lateral angles of the pronotum strongly projecting, by the femora not being broadly black, by the black mark on the base of the abdomen having its apical part narrowed at the base, then broadly dilated laterally, and the second abdominal segment is not strongly reflexed.

The male of *fulvitarsis* is similarly colored to the female, except that the coxæ, trochanters and four anterior femora are yellow below; the clypeus wants the black, is longer compared with the width and has the apex roundly incised; the apical joint of the antennæ, its hook and the underside of the penultimate joint below are rufous; the hook is slender and reaches only to the apex of the last joint; the outer edge of the pronotum projects a little—in the female not at all—but not so conspicuously as in *lineativentris*; nor is the apex of the second abdominal segment strongly reflexed as it is in that species. The size and form of the black mark on the clypeus in the female varies.

Odynerus (Ancistrocerus) colon Cresson.

Fedor, May. In what I make out to be this species (described in Trans. Am. Ent. Soc., IV, 241), the lower half of the sides of the metanotum are broadly yellow and covered densely with woolly white pubescence; there is an irregular small spot near the apex of the mesonotum; the apex of the first abdominal segment is slightly, of the second more distinctly turned up; the basal slope of the first segment is triangular, with an irregular, not very distinct crest; there is no spot on the second segment, which is distinctly longer than wide and is not perceptibly narrowed at the base. The clypeus is strongly but not closely punctured and with some longitudinal striæ on the apical half in the middle; its apex is distinctly depressed, clearly separated and transverse at the apex; in length it is slightly but distinctly greater than its greatest width. On the

upper, outer face of the metanotum is an oblique keel. The fuscous pubescence on the head is denser and longer than it is on the thorax. Apical slope of metanotum rather strongly punctured.

Odynerus edwardsii sp. nov.

Black; the clypeus, except for a small conical mark (the narrowed end above), shortly over the middle, a small triangular mark near the base of the mandibles, a small irregular mark, wider than long, over the antennæ, an irregular spot at the outer side of the antennæ, a short line near the top of the outer orbits, a line on the basal third of the pronotum, narrowed in the middle, two broad marks, narrowed on the innerside and divided by a furrow on the scutellum, a broad curved mark on the sides of the metanotum, postscutellum, a large conical mark on the mesopleuræ below the tegulæ, a minute one below it, the sides of the first abdominal segment, its apex more narrowly, the black central mark at the apex projecting laterally, the lateral projections shorter than the central part and slightly narrowed outwardly, the basal fourth of the second segment, its apex in the centre projecting, uniting it with a broader, more irregular transverse band which does not extend to the sides, narrower bands on the base of the third and fourth, narrowed slightly at the sides, a band on the fifth broadly dilated on the outer third; the sixth, except for a broad, oval spot on the apical third, the second ventral, except narrowly at the base, and for an oblique line projecting from its sides, straight on the inner, rounded on the outer in the centre, the sides broadly roundly dilated, the apices of the fourth and fifth broadly, deeply in the centre, narrowly laterally, lemon-yellow. Legs yellow, the base and upper sides of the fourth anterior coxæ, their trochanters, the fore femora broadly, the middle more narrowly at the base, both more broadly above than below, the hind coxæ, trochanters, basal three-fourths of their femora black; the tarsi tinged with fulvous; the hind coxæ with a short thick tooth in the middle behind; the four hinder tibiæ marked with black on the innerside behind. Underside of antennal scape yellow. Wings hyaline, tinged with fulvous, the stigma testaceous. ♀. Total length 8 mm.

Head and thorax densely covered with long fuscous hair. Clypeus as wide as long, the sides and apex narrowly black, the latter narrowly depressed, transverse. Base of thorax transverse, the sides not projecting. Head not much wider than thorax. Apex of postscutellum transverse. Base of first abdominal segment without a distinct keel, but still margined; the second shorter than it is wide at the apex, which is flat. The sides of the metanotum are indistinctly keeled above.

Mountains near Claremont, California (Baker).

Is not unlike *A. rivularis* Cam. and *fulvitarsis* Cam. in coloration, but is smaller than the latter, which has not the apex of the black band on first abdominal segment dilated laterally, and the clypeus has broad lateral marks; *rivularis* has only a small square mark at the end of the black on the first abdominal segment; this is also the case with *fulvitarsis*, which has also broad side-marks on the clypeus, and the base and apex of the mark on the second are not united by a pedicle.

Odynerus (Ancistrocerus) arizonaensis sp. nov.

Black, densely covered with white pubescence, which gives it a grayish appearance; the underside of the antennal scape, two large oblique marks, twice longer than wide, on the top of the clypeus, a small mark twice longer than wide over the antennæ, a longish triangular mark on the base of the mandibles, a small mark behind the top of the eyes, two irregular marks on the apex of the pronotum, a round mark on the apex of the mesonotum in the centre, a smaller one on the sides, postscutellum, a large broad line on the sides of the metanotum, a largish mark on the pleuræ below the tegulæ; a large, oblique mark on the sides of the first abdominal segment, a large, irregular, longer than broad, counting transversely, mark on the sides of the second segment, broad lines, that on the first narrowed on the sides, on the first and second and narrow ones on the other segments, yellow. The apices of the four anterior femora narrowly, the base of the anterior tibiæ narrowly, its apex still more narrowly, and the four posterior tibiæ behind to near the apex, pale yellow. Wings hyaline, the apex of the costal and the greater part of the radial cellules smoky. ♀. Length to end of second segment 8 mm.

The punctuation is strong and close; on the clypeus the punctures are sparser, and especially above weaker. Clypeus as wide as long; its apex depressed, slightly roundly incised, the thickened sides forming almost teeth. Thorax longish, narrowed towards the apex. The postscutellum forms a raised transverse ridge at the base; its apex is broadly rounded. Sides of metanotum broadly rounded. First abdominal segment longish cup-shaped; its apex is only very slightly raised; the second is not much longer than wide, hardly narrowed at the base; its apex depressed, strongly reflexed; the basal crest is not prominent. Tegulæ yellow, black in the middle.

Oslar: Congress, Arizona.

Has the coloration of *colon*, but with the yellow paler; it is smaller, has the postscutellum more distinctly raised at the base and narrower, has the pubescence denser and paler; the apex of the clypeus is not transverse, and the second abdominal segment is strongly reflexed.

Ancistrocerus pelias sp. nov.

Black; the base and underside of antennal scape, the clypeus, mandibles, a line, not much narrowed below, three times longer than wide, above the antennæ on the front, the eye incision, the upper part shorter and wider than the lower, a broad line, narrowed below, on the upper half of the outer orbits, the pronotum to beyond the middle, tegulæ, a spot behind, a mark, somewhat oval in shape, on the apex of the mesonotum, a small spot on the sides of the scutellum in the middle, postscutellum, the sides of the metanotum broadly, the mark extending on to the pleuræ, a large squarish mark on the mesopleuræ above, a longer, narrower, more oblique one immediately below it, a line on the apex of the first abdominal segment, narrowed laterally and having attached to its sides a large oblique mark, somewhat more than one-third of the width of the segment, and extending along the edge of the top of the apical slope, a broad transverse line across the middle, reaching close to the middle and becoming narrowed on the inner side and united to a broad apical border laterally; the apices of the

following three segments broadly, the second ventral segment, except for a large black mark in the centre, this mark being broad at the base and apex, obliquely narrowed from both ends towards the middle and the other segments, bright sulphur-yellow. Legs sulphur-yellow, the coxæ behind, trochanters and basal two-thirds of the hind coxæ black. ♀. Length (total) 7 mm.

Clypeus pyriform, broadly rounded above, the apex with a distinct semi-circular incision; it is strongly, moderately closely punctured. Front and vertex closely, rugosely punctured, the pro- and mesothorax being more strongly punctured. Base of thorax transverse, the sides not projecting. Base of postscutellum rounded, its apex transverse. Median segment strongly aciculated; the sides rounded, coarsely punctured; the large, black central mark is roundly dilated on the sides, the top narrowed, with straight sides. First abdominal segment cup-shaped, with a short, but distinct pedicle at the base, strongly punctured, especially towards the apex; the second is as wide as long, weakly punctured, except at the apex, where the punctuation is much stronger; the other segments are aciculated, punctured distinctly at the apex. Antennæ stout, the apical joints brownish.

Ormsby Co., Nevada.

What is perhaps the male of this species has the second ventral segment black, except at the apex; the yellow mark on front is much wider above, it becoming gradually wider from the bottom to the top, forming a triangle; the clypeus is broader compared with the length and has an apical incision as long as it is wide at the apex. *A. pelias* comes close to *A. spilogaster*, which may be known from it by the projecting sides of the pronotum, by the absence of the broad yellow marks on the metanotum, by the two spots on the second abdominal segment being enclosed in the black, and by the densely haired body. *A. lineativentris* has also the body densely haired, the clypeus broadly black in the middle, and the metanotum not yellow laterally.

The group of **fundatus** Cress.

The line on first abdominal segment dilated laterally, the second with an enclosed yellow spot, the legs for the greater part red, mixed with yellow.

Ancistrocerus fundatus Cress.

This species has been taken at Fedor and Lee Co., Texas.

Ancistrocerus ventones sp. nov.

Black; a longish mark, dilated above, narrowed on the lower half, touching the yellow on the clypeus, a mark on the inner eye orbit, basal half of mandibles, a short line on the outer orbits, two large marks, widest on the innerside and not reaching to the middle, a small mark in the centre of the mesonotum,

postscutellum, an oval mark on the sides of the metanotum at the base, a mark, longer than it is wide, at the top, transverse above, rounded below, on the base of the mesopleuræ above, a broad line on the apex of the first abdominal segment, with a large mark, oblique and narrowed towards its base, issuing from its sides, an irregular oval mark near the middle of the second segment, its apex more broadly and regularly than the first, the line extending below; two large oval marks on the second ventral, and a line on the middle of the fourth and fifth dorsal, yellow. Legs rufo-fulvous, the coxæ and trochanters black; the apex of four anterior femora and the tibiæ in front yellow. Wings hyaline, tinged with fuscous, highly iridescent, the stigma and nervures black. ♂. Length (total) 6 mm.

Head strongly, deeply, but not closely punctured; the clypeus strongly but more sparsely punctured; it is not much longer than its greatest width; its apex depressed, ending in two stout teeth. Thorax strongly, closely punctured, except at the base of the metapleuræ, where it is aciculated; its base transverse, with the sides angled. Apex of postscutellum broadly rounded; the sides of metanotum somewhat narrow, almost margined above, below armed with a longish, narrow, oblique spine. Apex of first abdominal segment slightly, the apex of second distinctly reflexed; the second is clearly longer than it is wide at the apex; it has there a row of longish foveæ. Flagellum of antennæ brownish below; the hook does not extend much beyond the base of the last joint.

Fedor, Texas; February.

Characteristic of this little species are the two large ovalish marks on the second ventral abdominal segment. Otherwise it looks like a small example of *O. vegasensis* Cam.; that species has the body more densely and distinct pruinose, the apex of postscutellum is dilated in the middle, and the sides of the metanotum are broadly yellow. *O. toas* Cress. agrees closely in coloration.

Ancistrocerus antheus sp. nov.

Black; the clypeus, mandibles, except the teeth, a line on the lower part of the eye incision, dilated above, a mark, gradually narrowed below, above the antennæ, a short line on the outer orbits, two large marks, roundly narrowed behind; on the pronotum, postscutellum, broad lines, the first slightly dilated before the end, which is narrowed, on all the abdominal segments, the lines on the second and third all round, an irregular mark near base of second, almost the apical half of the fore femora, the apical third of the middle, the apex of posterior narrowly and the tibiæ and tarsi, bright sulphur-yellow. Tegulæ large, yellow, with a fuscous spot; there is an irregular yellow mark on the pleuræ below them. Wings hyaline, highly iridescent, the stigma dark fuscous, the nervures black. ♂. Total length 5 mm.

Clypeus slightly longer than wide, broadly rounded above; the apical teeth triangular, the incision becomes gradually widened from the top to the bottom, forming a triangle; the punctuation is strong, but not close. Front and vertex strongly, closely punctured, as is also the thorax, but more strongly. Base of thorax transverse, the sides not projecting. There are two short wide depressions on the apex of mesonotum, a narrow but distinct furrow down the apical

two-thirds of the mesonotum, and there is an irregular one below the middle of mesopleuræ. The yellow on the postscutellum is obliquely narrowed at the base, the middle there is slightly incised. Metanotum above strongly punctured; the lower part and the pleuræ strongly aciculated; the sides are rounded. Abdomen, except the basal slope, closely, strongly punctured; the apices of the first and second more strongly punctured, but not reflexed. The antennæ are stout, become thicker towards the apex, have the scape yellow below, the apical two joints below and the hook brownish; the hook reaches close to the base of the penultimate joint. The second abdominal segment is slightly, but distinctly longer than it is wide at the apex.

Ormsby Co., Nevada.

Comes near to *A. ormsbyensis* Cam. and *A. gunnisonensis* Cam., both of which may be separated from it by the head and thorax being densely covered with fuscous hair and by the second segment not having two yellow spots.

Ancistrocerus satyrus sp. nov.

The punctuation is as in *antheus;* the incision on the clypeus is rounded, not gradually narrowed; the striation on the metanotum is stronger, more regular and oblique; the marks on the second abdominal segment are broader and distinctly narrowed at the base, the segment itself being shorter compared with the width. All the coxæ are yellow below; the mark below the tegulæ is longer than wide, rounded and narrowed at the top and bottom; the frontal mark is large, the narrowed lower part is clearly separated and is shorter than the dilated upper; there is a furrow down the middle of the scutellum and a wide, irregular oblique one on the base of mesopleuræ below the middle. Total length 6 mm.

Ormsby Co., Nevada.

This species is very like *A. antheus*, having the same bright sulphur-yellow marks; the two may be separated as follows:

The four anterior femora broadly black at the base, the yellow on postscutellum obliquely narrowed laterally at the base, the middle not transverse, slightly incised; the line on basal abdominal segment not distinctly dilated laterally..... **antheus.**

The anterior femora narrowly black at the base, the middle without black; the yellow on postscutellum broadly rounded at the base; the line on second segment broadly dilated laterally..... **satyrus.**

Ancistrocerus tityrus sp. nov.

Black; a line or three spots on the top of the clypeus, a small spot over the antennæ, an obscure one in the eye orbits, the underside of the antennal scape, a short line near the top of the outer orbits, two broad marks on the pronotum, postscutellum, a large mark on the sides of the base of metanotum, a broad conical mark on the pleuræ below the tegulæ, a line, dilated laterally on the apex of the first abdominal segment, a similar line, extending on to the ventral surface, on the second, a broad, conical mark—the transverse end at the base—near the base of the second and narrower lines on the third to fifth segments, yellow.

Legs black, the apex of the four anterior femora, all the tibiæ except at the apex yellow, the anterior tarsi rufous, or tinged with rufous. Wings hyaline, the radial cellule fuscous-violaceous, the stigma and nervures black. ♀. Total length 7 mm.

Clypeus as long as wide, aciculated, with clearly separated, longish punctures; the apex projecting, smooth, shining, depressed, not quite transverse. Front and vertex closely, rugosely punctured. Base of thorax transverse, the angles not projecting. Apex of postscutellum broadly, roundly narrowed, the yellow part almost transverse. Metanotum irregularly reticulated above; the centre aciculated-striated, the sides narrowly rounded. Metapleuræ strongly aciculated-striated, the rest strongly punctured. Basal slope of first abdominal segment aciculated, weakly, sparsely punctured, the rest strongly punctured; the apex not reflexed. The second segment is closely, finely punctured, more strongly towards the apex, which is not reflexed. Tegulæ yellow, a fuscous spot at the base.

Ormsby Co., Nevada, July 6th.

Allied to *pedestris* Sauss. It is smaller, has the yellow much brighter, more lemon in tint, the thorax shorter compared with the width, as is also the second abdominal segment; the yellow marks on the metanotum are much larger and the apex of tibiæ and tarsi are black, not yellow.

Ancistrocerus pedestris Sauss.

A male from Fedor, Texas. It is nearly related to *ventones* Cam., described in this paper; it may be known by the apex of femora, tibiæ and tarsi being yellow, by the clypeus being much more strongly punctured, by the line on the first abdominal segment not being so strongly dilated laterally, by the mark on the second segment being nearer the base, and by the second segment being longer compared with the width—in *ventones* it is not much longer than wide, in *pedestris* very clearly longer than it is wide at the apex—and the sides of the pronotum are not spinose as in *ventones*. In the ♂ of what I regard as *pedestris*, there is a small yellow mark on the sides of the metanotum at the base, and the yellow on the lower edges of the latter is obscure. In a specimen (♂) from Lee Co., Texas, the lateral metanotal spots are absent; on the other hand, there are two small yellow spots on the lower surface of the second abdominal segment. In both the apex of the second segment is strongly reflexed.

The group of **anormis** Sauss.

Small species, the yellow pale, the yellow line on the first abdominal segment usually dilated laterally, the second segment with an enclosed yellow spot.

A. ormsbyensis Cam., *A. gunnistonensis* and *A. trichionotus* Cam. agree with this group, except that the second abdominal segment has no yellow spot, and that the body is more densely haired.

Odynerus anormis Say *sec.* Sauss.

What may be this species is represented by two males. They agree fairly well with the descriptions, but differ or show variation in the coloration, *e. g.* one has the two yellow spots on the second ventral segment, shown in Saussure's figure (Pl. XIV, f. 1). They are only 7 mm., while Saussure gives 11 mm. as the length of *anormis;* that length, however, probably refers to the ♀. In a specimen from Colorado the yellow lateral line on the metanotum is much broader, longer and more distinct than it is on one from Texas (Fedor). The top of the first abdominal segment is rougher than it is in *Odynerus* proper.

The group of fulvipes Cress.

The first abdominal segment with a free oblique lateral spot; the second with a free spot; the legs for the greater part fulvous.

Differs from the *fundatus* section in the spot on the basal abdominal segment being elongated and not joined to the apical line.

Odynerus austrinus Cress.

Taken in Lee Co., Texas, in June.

To this group may be referred *arizonensis* Cam.

Odynerus (Ancistrocerus) fulvipes Cress.

Black; a curved line on the top of the clypeus, a small irregular mark over the antennæ, one of the same size in the eye incision, a triangular mark on the base of the mandibles, a short line behind the eyes, underside of antennal scape, a small spot behind the tegulæ, a larger one, longer than broad, in the centre of the mesonotum at the apex, postscutellum, a broad line on the apical two-thirds of the sides of metanotum, an irregularly oval mark on the pleuræ below; above, the centre and apex with the punctures larger and confluent; the apex depressed, transverse. Front and vertex closely and strongly punctured. Thorax strongly punctured; the base transverse, the edges slightly projecting. Apex of postscutellum broadly rounded. Sides of median segment with a distinct margin; the lower edge stoutly bidentate. First abdominal segment longer than it is wide at the apex, which is very slightly reflexed; the second segment is clearly longer than it is wide at the apex; its apex is more distinctly reflexed. The band on the second segment does not extend all round below.

The male has the clypeus yellow; its apex depressed and transverse in the middle, the sides projecting into stout teeth; the sides of the metanotum want the yellow lines and the apices of the first and second abdominal segments are more strongly reflexed. The terminal antennal hook is narrow, black and ex-

tends beyond the apex of the penultimate joint. The mark over the antennæ is continued as a line below, and the lower part of the eye incision is lined with yellow. The tegulæ in both sexes are for the greater part rufo-fulvous.

I, at first, thought that this species might be *O. colon* Cress., but that species, according to Mr. Cresson's Catalogue (Cat. of the Des. Hym. of N. Am. North of Mexico, p. 288), is an *Odynerus* sensu str.; it has also a spot on the side of the second abdominal segment, and the ♂ has the clypeus "deeply notched at apex" which is certainly not the case with my species.

Odynerus (Ancistrocerus) philetas sp. nov.

This species comes near to *O. fundatus* Cress., which also occurs at Fedor. The two may be separated thus:

Legs dark ferruginous, black at the base; the oblique mark on the first abdominal segment small, not extending to the middle of the segment; the mark on the second abdominal segment small..... **fundatus.**

Legs black, the apex of femora, tibiæ and tarsi bright lemon-yellow; the oblique mark on the first segment large, wide, extending to the middle; the mark on the second segment large..... **philetas.**

Total length 10 mm. ♀. Black; a curved mark on the top of the clypeus, a small mark, dilated above, over the antennæ on the front, one in the eye incision, a narrow line on the base of mandibles, a short line behind the eyes, two large marks on the base of thorax on the outer edge, a small square mark on the apex of mesonotum, postscutellum, the sides of metanotum broadly, the mark extending on to the pleuræ, a large mark, widest above, on the base of mesopleuræ above; a line on the apex of the first abdominal segment, largely, obliquely dilated at the sides to the middle of the segment, where it is obliquely narrowed; a large, oval, transverse mark on the sides of the second near the base, a broad line on the apex of the second and narrower ones on the apices of the following three, lemon-yellow; the apex of the femora (the posterior only narrowly) and the tibiæ of a brighter yellow color; the tarsi rufous, as also the apex of the tibiæ narrowly. Antennæ black, the scape yellow below. Wings hyaline, slightly tinged with fulvous, the apex fuscous-violaceous.

Clypeus longer than wide, the punctures longish, clearly separated, the apex transverse. Front and vertex closely, rugosely punctured. Prothorax and mesothorax closely, rugosely punctured. Metanotum rugosely punctured above, the rest closely, obliquely striated, its sides rounded. Base of metapleuræ almost smooth, the rest closely, finely punctured. Apex of first abdominal segment slightly raised; the basal slope weakly punctured, compared with the rest; the two parts not very clearly separated. The second segment is clearly longer than it is wide at the apex, where it is more strongly punctured and has a coarsely crenulated furrow behind the raised apex. The apical segments are closely punctured.

Fedor, Texas.

Ancistrocerus leensis sp. nov.

Black; underside of antennal scape, clypeus, mandibles, except the lower edge, a mark between the antennæ, commencing at the clypeus, longish, roundly dilated above, an irregular mark in the eye incision, a short line near the top behind the eyes, the base of the pronotum to near the middle, a small spot on the mesonotum in the middle near the apex, postscutellum, a large pyriform mark below the tegulæ, the apex of the first abdominal segment, an oblique line running from its outerside towards the middle of the segment, the two reaching close to the middle, an irregular spot on the sides of the second segment near the base, the apex broadly almost all round and a narrow line in the centre of the fourth, bright lemon-yellow. Coxæ and trochanters black, the femora fulvous, the tibiæ and tarsi yellow. Wings hyaline, the radial cellule smoky; the costa, stigma and nervures black. ♂. Length (total) 8 mm.

Lower part of clypeus distinctly longer than wide; the apex with an incision as long as it is wide; the punctuation is strong, sparse. Front and vertex strongly closely punctured; the head, as is also the thorax, thickly covered with pale pubescence. Base of thorax not quite transverse, the centre slightly curved inwardly; the lateral angles blunt. Postscutellum rounded at base and apex. Sides of metanotum broadly rounded, strongly punctured; almost reticulated; the centre is not so rugosely, coarsely punctured as the sides. Metapleuræ more weakly and sparsely punctured than the rest. First abdominal segment much more coarsely punctured than the second, the apex with a band of larger punctures, the basal slope more irregularly and weakly punctured, the extreme apex slightly raised. The second segment is clearly longer than wide, closely, but not strongly punctured; its apex much more strongly punctured and more distinctly reflexed than the first. Underside of flagellum and hook black.

Lee County, Texas.

This is a smaller and more slenderly built species than either *austrinus* or *fulvipes*, with which it agrees in having two oblique lines on the base of abdomen; the sides of the metanotum are much more broadly rounded, not at all angled and the femora only are fulvous.

Ancistrocerus rivularis sp. nov.

Black; clypeus, mandibles, a triangular small spot over the antennæ, a short, narrow line on the top behind the eyes, antennal scape except on top, a broad line, narrowed in the middle, on the base of the thorax, tegulæ, a broad band on base of postscutellum, a band on the upper three-fourths of the metanotum on the sides, broad above, narrowed below, the lower part produced on the inner-side, a large mark, longer than wide, transverse above, rounded below, on the pleuræ below the tegulæ, sulphur-yellow; the abdomen sulphur-yellow, with the following black markings: the basal slope of the first abdominal segment, from the centre of this, runs to shortly beyond the middle, a line, clearly longer than wide, broadly rounded at the apex, from which runs a short narrow point, a broad line on the base of the second segment; it becoming gradually narrowed towards the apex, to which is attached a narrower and shorter transverse mark, the sides of which become gradually narrowed to a point; broad bands, extending slightly beyond the middle, on the base of the following three segments, a

narrower three-waved band on the fourth, the fifth to shortly beyond the middle, a narrow line round its sides and apex; the ventral surface with the following black markings: the first segment, except for a triangular mark on the sides at the apex, an irregular narrow line, narrowed to a sharp point at the apex, on the centre of the basal two-thirds of the second, lines on the following three, roundly dilated at the sides, and the whole of the last. Legs colored like the body, but paler, the four anterior behind to beyond the middle of the femora and the hinder all round to near the apex of the femora. Wings hyaline, the base suffused with fulvous, the apex with violaceous, the costa and stigma fulvous. ♂. Length 7 mm. to end of second segment.

Head and thorax strongly, closely punctured, thickly covered with dark fuscous hair. Clypeus clearly longer than wide, sparsely, strongly punctured; its apex with a shallow rounded incision. Base of thorax transverse, the sides not transverse. Apex of metanotum irregularly transversely striated; the sides at the top project into a clearly separated (especially at the base) testaceous tooth; they are irregularly margined on upper half. First abdominal segment cup-shaped, sparsely, but distinctly punctured; the second is almost square, not much narrowed at the base; the basal half finely, the apical coarsely punctured, its apex only very slightly reflexed; the other segments are strongly punctured, especially at the apex.

Three Rivers, California.

This species has the abdominal markings pretty much as in *A. durangoensis*, which may be known from it by the sides of the pronotum projecting, by the strongly reflexed apices of the second and third abdominal segments, and by there being a broad lateral mark on the sides of the second ventral, on which there is no central line.

Auclstrocerus durangoensis sp. nov.

Black; the clypeus, mandibles, except the teeth, a small mark over the antennæ, broad and rounded above, obliquely narrowed below, a short narrow line on the outer orbits above, underside of antennal scape, a line, narrowed in the centre, on the base of pronotum, tegulæ, a small oval mark on the sides below them, two marks on the apical half of the scutellum, rounded at the base, transverse at the apex, the apical half of postscutellum and the greatar part of the abdomen, bright sulphur-yellow; the following parts of the abdomen are black: the basal slope, the black produced in the centre at the apex, into a point of equal width and slightly broader than long, its apex transverse, not reaching to the centre of the yellow apical part, the basal fourth of second segment, the band widened laterally; attached to it is a slightly narrower band which does not reach the sides, the short pedicle by which it is attached to the basal band, being as wide as its lateral projections, there are waved basal bands on the third to fifth, and the apical is entirely black; the first ventral segment is black, except for a transverse yellow line near the apex; there is a narrow tripartate line—the central projection much smaller and more sharply pointed than the lateral—on the base of the second; from its sides projects a stout oblique mark, rounded and slightly narrowed at the apex; the following segments two are black at the base, the last is entirely black. Legs of a paler yellow than the body; the greater

part of the anterior coxæ, the four posterior behind, the basal half of the four anterior femora and the posterior entirely to shortly beyond the middle, black. Flagellum brownish below. Wings hyaline, suffused with fulvous on the basal half, the apex smoky violaceous; the costa and stigma fulvous. ♂. Length to end of second abdominal segment 8 mm.

Head and thorax densely covered with long fuscous pubescence; the abdomen with shorter pubescence. Clypeus pyriform, clearly longer than broad, its apex with a rounded, wider than long incision; the puncturation is strong, but not close; on the front and vertex it is strong and close, as it is also on the pro- and mesothorax. There is a smooth distinct furrow down the centre of the scutellum. Apex of postscutellum broadly rounded. There is a smooth, longer than it is wide at the base, triangular area at the base of the metanotum; the upper lateral angles are bordered by a distinctly raised and defined border, which below, in the middle of the metanotum, projects into a stout triangular tooth, the upper part shorter than the lower. First abdominal segment cup-shaped, broadly rounded at the base, the apex with a smooth raised border, which is bordered behind by a line of deep foveæ; the second is as long as it is wide, roundly narrowed at the base, its apex stoutly reflexed, as is also the case with the third; the puncturation is strong and close. Antennal hook rufous, not extending much beyond the base of the tenth joint. Base of thorax transverse, the sides shortly but distinctly projecting.

Durango, Colorado, May (Oslar).

Belongs to the group of *sulphureus* Sauss.

Ancistrocerus truncatus sp. nov.

Black; a broad line on the top of the clypeus, a small mark, longer than wide, transverse above and below above the antennæ, an irregular mark on the inner corner of the eye incision, a short narrow line on the base of mandibles, a longer, broader one behind the top of the eyes, a large triangular mark on the sides of the pronotum at the apex, a small squarish mark in the middle of the mesonotum at the apex, a conical mark on the sides below the tegulæ, postscutellum, the outer edges of the metanotum broadly, lines on the apices of the abdominal segments, a broad oblique mark on the outer edge of the first, joining the apical band and a large, transversely oval mark on the sides of the second, pale yellow. Legs black; the apical half of the four front femora from near the middle behind and more narrowly in front, the posterior at the extreme apex and the tibiæ and tarsi yellow; the tarsi suffused with fulvous. Wings hyaline, iridescent, the radial cellule violaceous, the nervures and stigma black. ♀. Length 9 mm.

Head and thorax closely, distinctly punctured, the metapleuræ smooth at the base, the rest closely, obliquely striated. Clypeus longer than it is wide, its apex transverse. Base of thorax transverse, the sides not projecting. Apex of postscutellum rounded. Sides of metanotum rounded, not margined. The second abdominal segment square, its apex smooth, slightly raised. The pubescence is short and sparse, the underside of the scape yellow.

Berkeley, Colorado, June (Oslar).

There is an example of what is probably the ♂ from Las Vegas, New Mexico. It has the clypeus yellow, transverse at the apex;

the mark over the antennæ is longer and dilated above; except that there is no yellow spot on the mesonotum and two on the underside of the second abdominal segment, the markings are as in the ♀; but the yellow line on the lower side of the eye orbits goes all round it. Clypeus pyriform, longer than wide, it apex transverse. Underside of flagellum brown; the hook of a darker brown color; it reaches to the middle of the penultimate joint. The basal half of the second femora is hollowed slightly and roundly dilated behind. The yellow marks on the pronotum are of equal width, square, not triangular as in the ♀; the black on the femora is less developed; the oblique mark on the first abdominal segment is more narrowed on the innerside and the mark on the second is larger and more regularly oval.

Related closely to *A. philetas* Cam., from Texas, which may be known from it by the second abdominal segment being distinctly longer than wide; while in *truncatus* it is fully wider than long, the mark on the pronotum on the latter is triangular in *philetas*, not much narrowed on the outerside, the line on the clypeus is much narrower; the clypeus itself, too, being broader compared with the length; also the black on the femora is longer.

Ancistrocerus ormsbyensis n. sp.

The ♂ of this species was described in "Invert. Pacif.," i, 120. The ♀ has been taken at Gunnison, Col. Like the ♂ it is densely pilose; it has the clypeus yellow, with a broad black mark in the centre of the upper two thirds; the upper two-thirds of the clypeus is of equal width, the lower is gradually narrowed to a point; it is slightly longer than its greatest width; it is sparsely longitudinally punctured; its apex is black and transverse. The basal five segments of the abdomen have moderately broad yellow bands of equal width; the four front femora are more broadly black than in the ♀. As in the ♂, the wings are largely tinged with fulvous. There is a ♂ from Denver, Col., which has the black lines on the four anterior femora shorter than in the type.

Ancistrocerus lecontei sp. nov.

Black; the head, thorax and base of abdomen densely covered with long dark pubescence; two broad curved marks on the top of the clypeus, two much smaller marks, transverse on the outer, rounded on the inner side, above the apex, a small transverse mark over the antennæ, a small spot behind the top of the eyes, a line on the pronotum, narrow in the middle, broadly dilated laterally, an

oblique conical spot below the tegulæ, apex of tegulæ (their base fuscous), two irregular transverse conical marks on the scutellum and the apices of the basal five abdominal segments and the apices of the second to fourth ventral, bright lemon-yellow. Tibiæ yellow, the apex of the tarsi dark testaceous. Wings almost hyaline, smoky along the fore margin; the stigma testaceous, the nervures black. ♀. Total length 12 mm.

Clypeus as broad as long, sparsely, distinctly punctured, the apex transverse, depressed. Base of thorax not quite transverse, the apex distinctly keeled on the sides, the obliqne lower part with the keels stouter than on the upper part. Thorax somewhat more than twice longer than wide, flat above, the parapsidal furrows reaching from the base to the apex. Basal slope of first abdominal segment triangular, clearly separated above, aciculated; the apex distinctly punctured; the second is much less strongly punctured; it is distinctly longer than wide and has the apex flat. Apex of postscutellum transverse.

Ormsby Co., Nevada, July (Baker); Berkeley and Golden, Colorado, August.

What appears to be the ♂ (from Berkeley) has the clypeus, labrum and tarsi lemon-yellow, the coloration otherwise being as in the ♀; except that the flagellum is brownish below; its hook is stout, brownish and hardly projècts over the base of the joint. Clypeus not much longer than wide, more closely punctured than in the ♀; its apex has a semicircular incision. The parapsidal furrows are not so deep as in the ♀.

Comes close to *A. capra* Sauss.

Ancistrocerus lindemanni sp. nov.

Black; the clypeus, base of mandibles, eye incision, a longish mark, broad above, gradually narrowed below, where it is one-third of the width of the top, a short narrow line on the upper part of the eye orbits, a line on the base of thorax, a small, irregular, wider than long, mark in the centre of the mesonotum at the apex, postscutellum, a wide conical mark below the tegulæ, lines on the apices of all the abdominal segments and an irregular spot on the sides of the second segment at the base, yellow. Legs pale yellow, the four anterior coxæ, trochanters and femora and the posterior entirely, black. Wings hyaline, the radial cellule clouded; the stigma fuscous, the nervures black. ♂. Length 5 mm.

Clypeus pyriform, clearly longer than wide, the apex with a wider than long incision; it is sparsely, strongly punctured. Base of thorax transverse, the lateral angles not projecting; its apex with blunt sides; the top of the metanotum irregularly reticulated, the rest closely, finely striated; metapleuræ above sparsely punctured, the rest aciculated. Base of first abdominal segment triangular, smooth; the apex strongly but not closely punctured; the second segment is slightly longer than wide, weakly, sparsely punctured at the base, more strongly towards the apex, which is reflexed. Antennal scape yellow below; the apex below and the hook brownish; the latter does not quite reach to the apex of the last joint.

Lee County, Texas.

Ancistrocerus cockerelli sp. nov.

Black; a longish triangular mark over the antennæ, a line on the lower part of the eye incision, a mark, longer than wide, of equal width, in the centre of the apex of clypeus, the sides of it prolonged along the teeth, the apex therefore incised, a longish wide line on the upper part of the outer orbits, a broad line, narrowed in the middle, on the base of thorax, tegulæ, basal half of postscutellum, a triangular mark on the upper half of the sides of metanotum, an oblique conical mark below the tegulæ, a line on the apex of first abdominal segment, broadly dilated laterally to the top of basal slope, an oblique conical spot—the narrowed end on the innerside—on the sides of second segment, the apex of the latter broadly, narrowed in the middle, narrow lines on the centre of the second and third segments, and a line gradually narrowed inwardly, on the sides of the second ventral segment, pale yellow. Wings iridescent, slightly infuscated, the nervures and stigma black. ♀. Length 5 mm.

Clypeus as broad as long, the apex transverse in the middle, the sides forming blunt teeth. Apex of mandibles rufous. Underside of flagellum brown. Base of thorax not quite transverse, the middle being slightly dilated, the sides of the apex bordered by a distinct keel, the upper part of the keel broadly rounded; except at the sides of the upper half, the apex is finely, closely transversely striated. There are two broad longitudinal furrows on the apical half of the mesonotum, a deeper one on the apical half of the scutellum, which has two obscure yellow marks on the apex. The first and second abdominal segments are strongly punctured at the apex, which is not reflexed, but slightly thickened; the second is square.

Ormsby County, Nevada; July (Baker). A longish, narrowish insect.

Ancistrocerus bakerianus sp. nov.

Black; the clypeus, an irregular spot on the eye incision, an interrupted line, gradually, obliquely dilated from the inner to the outerside, two irregular spots on the apex of the scutellum, a conical pleural spot, a line on the apex of the first abdominal segment, roundly dilated in the middle, a line on the apex of the second, broadly dilated backwards on the sides and continued along the outer edge of the ventral surface, and a line on the underside of the antennal scape, pale yellow; the legs black, the tibiæ obscure yellow in front; the underside of the flagellum, with the hook, reddish brown. Wings hyaline, the nervures and stigma black. ♂. Length 4 mm.

Clypeus distinctly wider than long, the apex with a broad roundly curved incision. Base of thorax transverse, the sides not projecting. The sides of the metathorax are roundly curved from the base to the apex. Upper half of metapleuræ with strong, clearly separated punctures, the lower smooth. Second abdominal segment as long as it is wide at the apex, which has a crenulated furrow in the middle. Antennal hook stout, reaching to the base of the eleventh joint, which is distinctly longer than the tenth. The trophi are longer and stouter than usual.

Ormsby County, Nevada; July.

Ancistrocerus sayi sp. nov.

Black; the clypeus, a mark filling the eye incision, narrowed below, a longish mark over the antennæ, the top transverse, the upper two-thirds becoming gradually narrowed below, the narrowed lower part twice longer than wide, a line on the top of the outer orbits, mandibles except at apex, a interrupted line, gradually widened on the outerside, on the base of the thorax, two irregular marks on the scutellums, those on the postscutellum almost continuous, a large conical spot below the tegulæ, a line, with an irregular basal edge on the first abdominal segment, one obliquely dilated laterally on the second, a longish line gradually narrowed on the innerside, on the sides of the second ventral and an oblique spot, twice longer than wide, near the middle of the second, the apex of the femora and the greater part of the tibiæ, whitish-yellow. Wings hyaline, the nervures and stigma black, the second recurrent nervure interstitial; the wings are tinged with violaceous. Underside of antennal scape whitish-yellow, of the flagellum brown; the hook short, half the length of the joint. ♂ Length 5 mm.

Clypeus wider than long, the puncturation strong, but not close, the incision semicircular. Base of thorax transverse; the sides of the apex rough, rounded, the lower edge projecting into stout triangular teeth. The first abdominal segment longer than it is wide at the apex; it becomes gradually widened from the base to the apex; the second is longer than it is wide at the apex, the base narrowed, the apex flat. The apex of the first is more coarsely punctured than the rest, and has a short, wide, longitudinal furrow down the centre.

A slender, longish species.

Ancistrocerus gunnisonensis Cam.

There is a ♂ of this species from Denver, Colorado, and another from Durango, Colorado. The amount of rufous color on the underside of the antennæ varies, as does also the size of the yellow frontal mark. A ♂ from Chimney Gulch, Colorado, has the wings tinged distinctly with fulvous.

Ancistrocerus trichionotus Cam.

Invert. Pacifica, i, 120.

The ♂ only of this species has been described. The ♀ has been sent by Prof. Baker from Ormsby Co., Nevada, and from Berkeley and San Miguel Co., Colorado. The underside of the antennal scape is bright sulphur-yellow, the flagellum brownish at the apex below. Clypeus as long as wide, strongly but not closely punctured, pyriform, the apex not quite transverse, being slightly incurved; on either side of it is a broad curved mark, narrower above than below and reaching below to the middle; above the narrowed apex are two small irregular marks. The pubescence on the head, thorax and base of abdomen is long, dark fuscous and dense. The metanotum above has, on eitherside, a curved, not very strong keel.

Ancistrocerus fulvicarpus sp. nov.

Black; the clypeus except for a pyriform black mark in the centre of the upper half, it being narrow above, becoming gradually obliquely narrowed to the apex, which is broad and rounded, a small mark, widened in the middle, over the antennæ, a narrow, longish mark on the base of the mandibles, a small mark, longer than wide, at the eyes, opposite the antennæ, a short line on the top of the upper orbits, the basal half of the pronotum, two large marks narrowed on the innerside, on the apical half of scutellum, postscutellum, the sides of metanotum broadly, the lines dilated on the innerside above, a large, oval mark below the tegulæ, and the greater part of the abdomen, yellow suffused with rufous; the following parts of the abdomen are black: the basal slope of the first segment, this part continued on to the apical half of the apical part; the base of the mark is narrowed, of equal width and is nearly as long as the dilated apex, which becomes gradually wider, the basal third of the second segment, this line having attached to it by a short pedicle a line of the same width, which does not extend to the sides, its outer edges being obliquely narrowed; the third is broadly black at the base, the last at the apex and entirely below; the first ventral is entirely black; the second, except broadly at the apex, the middle of the black being broadly incised. Legs of a more rufous yellow; the coxæ, trochanters, basal half of the four anterior femora and the posterior to near the apex black. Wings hyaline, the base suffused with fulvous, the apex with fuscous violaceous, the costa and stigma fulvous. ♀. Length 11 mm.

Clypeus broadly pyriform, as wide as long, its apex transverse. Head and thorax closely punctured, thickly covered with long fuscous pubescence. Base of thorax transverse, the sides not projecting. Apical half of mesonotum with two distinct furrows. Apex of scutellum with a short, broad, almost smooth line down the centre. Base of postscutellum raised, coarsely rugosely punctured, the apex smooth, broadly rounded. Sides of metanotum with a bordering keel; the upper half rounded, the lower separated from it, through its projecting, the top of the projection rounded and much more prominent than the rest. Centre of metanotum finely, obliquely striated. First abdominal segment cup-shaped, punctured, but not strongly; the second square, more strongly punctured, especially at the apex, which is broadly reflexed, as is also the third. Antennal scape rufous-yellow, black above.

Southwest Colorado; June (Oslar).

Ancistrocerus simulator sp. nov.

Black; the clypeus, mandibles broadly at the base, a small transverse oval spot, with a short pedicle below above the antennæ, a small spot at the eyes opposite the antennæ, a short, irregular line on the top of the outer orbits, the base of pronotum, the lateral widened parts semicircular, tegulæ, two transverse marks, narrowed on the innerside, on the base of the scutellum, the basal half of postscutellum, a moderately broad line on the sides of metanotum, its top dilated inwardly distinctly, the lower part much more narrowly, a mark, twice longer than wide, below the tegulæ, its top oblique, the apex rounded, and the greater part of the abdomen, sulphur-yellow; the black basal slope of the first abdominal segment broadly projecting over the slope above, this part incised laterally at the base, the incision shorter than the central part, the black apical projection being about half the width of the central part, the black on the second occupies almost

the basal three-fourths; the apical (and larger) part is narrower and longer than the basal, which extends to the outer edges; at the junction of the two is a longish triangular incision, which becomes gradually narrowed to a fine point on the inner; the third to fifth segments have black lines, dilated near the outerside, on the base; the last immaculate; the first ventral is black; the second with a large tripartite mark on the base; the central division is the larger, is triangular, with ragged edges; the lateral are curved, oblique, broadly, roundly dilated in the middle on the outerside; the others (except the last, which is entirely black) are black at the base, the bands roundly dilated on the sides. Legs pale sulphur-yellow, the tarsi and apex of tibiæ fulvous; all the coxæ and trochanters, the base of the four anterior femora narrowly and the posterior to near the apex, black. There is a black spot in the centre of the upper three-fourths of the clypeus; it becomes gradually widened to near the bottom, when it again becomes roundly narrowed to a fine point below. Wings fulvous-hyaline, the apex from the first transverse cubital nervure smoky violaceous; the nervures and stigma fulvous. ♀. Length 12 mm.

Head, thorax and base of abdomen densely covered with long fuscous pubescence. Clypeus pyriform, as broad as long, its apex with a shallow incision. Base of thorax transverse, the sides not projecting. Apex of mesonotum with two distinct furrows. Apex of postscutellum transverse, smooth. The sides of metanotum below the middle project into a blunt triangular tooth. First abdominal segment cup-shaped; the second wider than long; the puncturation on the first and second weak; on the apex of the latter it is stronger, and it is still stronger on the others. Underside of antennal scape yellow, of the flagellum brown.

Ormsby Co., Nevada, July (Baker).

Allied to *A. fulvitarsis* and *A. fulvicarpus;* it may be known from both by the wide, clearly separated transverse bar at the end of the black base of the abdomen; the latter may be further known by the second abdominal segment being black, except at the apex; *fulvitarsus* by the clypeus being black, except at the sides above and by the sides of the metanotum being not lined with yellow.

Odynerus (Ancistrocerus) acanthopus sp. nov.

Black; antennal scape below, a broad curved line with its lower sides narrowed and dilated downwards on the top of the clypeus, two small spots in the centre above the apex, an irregular oval mark on the front, a mark in the eye incision, widened above, narrowed below, a mark three times longer than wide on the top of the outer orbits, a longish mark on the base of the mandibles, a broad line on the base of the pronotum, the greater part of the tegulæ, a short oblique line on the mesonotum close to their apex, an irregular mark in the centre of the apex of the mesonotum, postscutellum, a small lateral mark on the base of the metanotum, a broad, irregular mark on the sides of the apical slope, a large irregular mark on the pleuræ below the tegulæ, a small mark on the first abdominal segment on the sides near the basal slope, a band on the apex of the first abdominal segment, widened in the middle and directed backwards at the sides, a large, oblique spot on the sides of the second, nearer the middle than the base, a broad band on the apex of the second and narrower ones on the others, bright

orange-yellow; the apex of the femora, the tibiæ and the tarsi yellow, tinged with fulvous. Wings hyaline, the radial cellule smoky, the stigma dark fulvous, the nervures blackish. ♀. Length to end of second abdominal segment 8 mm.

Hinder coxæ with a distinct, triangular tooth in the centre above. Clypeus strongly but not closely punctured, its apex depressed, almost transverse; it is as long as its greatest width, rounded above. Front and vertex closely almost rugosely punctured. Temples wide. Base of thorax transverse, its sides rounded. Mesonotum without basal furrows. Postscutellum prominent, rugosely punctured, except on the apex. Metanotum roundly depressed, the top in the centre with stout striæ, the sides rugosely punctured; a keel runs down the centre; on the sides at the apex are two yellow, prominent, diverging spines united at the base. The first abdominal segment has a distinct petiole at the base, the apical slope is triangular; smooth, above bordered by an irregular rugose band; the rest of the segment is strongly, closely punctured, the apex is more strongly punctured, it is slightly raised and smooth; the second is clearly longer than wide, narrowed slightly at the base; the punctuation becomes stronger towards the apex, the punctures there being wide, deep; the extreme apex is curled up.

Fedor, Texas; May.

Belongs to *Stenancistrocerus*. Characteristic is the distinct tooth on the hinder coxæ. It has the abdomen formed as in *Nortonia*, but I find so much variation in the structure of the first abdominal segment—it varying from sessile to pedunculate—that I doubt if the form of the basal segment can be used generically.

Nortonia ? basimacula sp. nov.

Black; the basal slope of first abdominal segment red, the red broadly dilated laterally, the apex of clypeus red, a broad curved band on top of clypeus, a small irregular mark above the antennæ and at the end of the eye incision, an elongated conical spot on the outer orbits near the top, a broad mark not quite reaching to the middle, on the sides of the pronotum at the base, postscutellum, a small irregular mark on the sides of the apical slope of metanotum, a band, broadly dilated in the middle, on the apex of the first abdominal segment, a large, irregular spot on the sides of the second near the base, a broad band of equal width on its apex, the band extending more narrowly on to the ventral surface to near the middle, where it is much narrowed, and a large, oblique, somewhat oval spot on the pleuræ below the tegulæ, orange-yellow; antennal scape yellow, tinged with red, the apex black above. Legs bright fulvous red, the coxæ black, the tibiæ at the base tinged with yellow. Wings almost hyaline, largely suffused in front with fuscous violaceous, the stigma dark fulvous, the nervures black. Tegulæ yellow, tinged with fulvous, darker in the centre. ♀. Length 8 mm.

Clypeus pyriform, strongly but not closely punctured, its apex almost transverse. Mandibles red, black at the base, with a white spot in the middle. Front and vertex strongly, irregularly, but not very closely punctured. Temples broad, rounded, its occiput almost transverse, distinctly keeled. Thorax more than twice longer than wide, transverse at the base, the sides not projecting; above it is strongly, closely punctured, except on the centre of metanotum, where

the puncturation is much sparser. Apex of postscutellum broadly rounded outwardly. Sides of metanotum broadly rounded; the puncturation on them runs into reticulations. Propleurae deeply depressed in the middle, the sides obliquely sloped, smooth. The mesopleurae as strongly, but not so closely punctured as the mesonotum, except on the basal slope which is smooth. Metapleurae smooth, sparsely punctured round the edges. The basal slope of the first abdominal segment is almost smooth; its top rough, with an irregular, twisted transverse keel; the base with a short, but distinct neck almost as in *Nortonia;* the rest of the segment is strongly closely punctured; it is cup-shaped, not quite so long as it is wide at the apex; the second segment is distinctly longer than wide, punctured, but not so strongly, nor so closely as the first; its apex is smooth, slightly raised; the other segments are closely, somewhat strongly, punctured; as usual, the puncturation on the second segment is rougher at the apex.

Fedor, Texas; May.

If not quite a *Nortonia* this species certainly forms a transition to that group, *i. e.* the pedicle of first abdominal segment is not so prominent as in *N. tolteca*, but the segment is not sessile, having a short but distinct pedicle.

Ancistrocerus (Nortonia ?) phoenixensis sp. nov.

Black, covered with a white pruinose pile; the underside of the antennal scape, a small square mark over the antennae, a short, narrow line on the upper outer orbits, two large marks on the sides of the pronotum, obliquely narrowed towards the outerside, a small irregular spot in the centre of the apex of mesonotum, postscutellum, a conical mark below the tegulae, the sides of metanotum broadly, lines on the apices of the abdominal segments, that on the first narrowed laterally and having a short oblique projection at the end, and an oval, oblique mark, of moderate size, on the sides of the second segment at the base, pale whitish-yellow. Legs black, the apices of the four hinder femora, the tibiae, except on the outerside, and the fore femora broadly above, brownish rufous, the rest of the tibiae and the apex of the fore femora whitish-yellow. Flagellum brownish below. Wings hyaline, the radial cellule smoky, the stigma dark testaceous, the nervures black. The male has the clypeus, a line on the base of the mandibles, a line about three times longer than wide over the antennae and one on the lower edge of the eye orbits, whitish-yellow. Length 8-9 mm.

The female clypeus pyriform, as long as broad, sparsely, weakly punctured, its apex narrowly but distinctly depressed, and with a shallow incision, the sides of which are straight, oblique. Thorax about twice longer than wide, its base transverse, not projecting laterally, the sides of the apex not very blunt, rounded on inner, flat on outer side. Apex of post-scutellum gradually bluntly narrowed; the basal part is prominent, clearly separated. The first abdominal segment cup-shaped, slightly longer than it is wide at the apex, the base distinctly narrowed into a neck, the second segment is as long as wide, its apex more strongly punctured than the rest.

The male has the underside of the antennal scape pale yellow, as is also the clypeus, the other markings being as in the female, except that the marks on the metanotum are smaller; the underside of the flagellum is orange-brown; the

hook is black and is a little longer than the joint; the middle femora become gradually widened below from the end to the apex of the basal fourth, where it becomes abruptly narrowed and is there hollowed above in front.

Oslar, Phoenix, Arizona; October 4th.

This species is not unlike *O. approximatus* Cam.; the ♂ in that species has the middle femora of normal form. It is not a typical *Ancistrocerus*, there being hardly a transverse ridge on the first abdominal segment, the sole difference being that the basal slope is smooth, the roughness commencing at its top. The form of the first abdominal segment is as in *Nortonia*.

Pterochilus 5-fasciatus Say.

This species is in the collection from Berkeley, Colorado, and Oslar, S. W. Colorado. One specimen is 18, the other 14 mm. long. The size and shape of the black markings on the basal two abdominal segments vary; in one it is shaped like an hour-glass, not continued to the outer edges of the segment at the apex; in another there is a triangle in the middle at the base, the apex of the triangle being at the middle of the segment; from there it is continued broadly to the outer edges of the segment. There is a shallow, semi-circular incision on the apex of the clypeus; the outer edges forming blunt teeth. In the smaller example there is a yellow fascia on the top of the red clypeus, the line on the lower inner orbits being also yellow. Basal joint of flagellum red, the other joints being brownish-red below. Palpal hairs long, rufous, sparse. Apex of postscutellum transverse, the base broadly rounded.

Pterochilus maculifrons sp. nov.

Black; red are: a large triangular mark on the front, its base united above by a transverse line to a broader one on the eye incision, the junction being above the incision; clypeus, mandibles, a broad line on the outer eye orbits, the prothorax, except the basal slope, two marks on the centre of the scutellum, broadest at the base, a line on either side of the black central part of the metanotum, the metapleuræ and two large marks on either side of the black central part of the basal two abdominal segments. Yellow are: a large mark, longer than wide, transverse above, rounded below; a triangular mark on the sides of scutellum, the apex at the base; postscutellum, the sides of metanotum broadly, and the apices of the abdominal segments (the line on the first is dilated backwards laterally, broadly and roundly) and a mark inside the red mark on the second segment, bright lemon-yellow. Legs red, the coxæ marked behind with black. Wings hyaline, the apex largely suffused with fuscous. Length (total) 14 mm. ♀.

Clypeus strongly punctured, less strongly on the top, where it is broadly rounded; it becomes gradually roundly narrowed from the eyes; the apex narrow, transverse. Apical two teeth of mandibles weaker than the basal two. Front and vertex strongly and closely punctured; there is a broad, longitudinal

furrow in the centre of the front. Thorax strongly, closely punctured, the punctuation on the mesonotum running into reticulations. There is a narrow black furrow down the middle of scutellum. The apex of the postscutellum is more rounded than the base. Base of thorax above bluntly rounded, the sides rounded, not projecting. The second and following segments of the abdomen are closely, distinctly punctured; the apical half of the second is depressed, the depression dilated backwards in the middle.

Oslar, Berkeley, Colorado.

This species agrees very closely in coloration with 5-*fasciatus*, but is smaller and more slenderly built.

The rounded, not projecting lateral angles of the pronotum form a ready means of separating this species from 5 *fasciatus*.

The two may be separated thus:

Apex of clypeus incised; the front immaculate; clypeus broader than long; apex of postscutellum transverse, base of thorax transverse, the lateral angles acute.....**5-fasciatus.**

Apex of clypeus transverse; the front with a large triangular red mark; the clypeus nearly as long as broad; apex of postscutellum rounded; base of thorax bluntly rounded, the angles rounded.....**maculifrons.**

Pterochilus pruinosus sp. nov.

Black, densely covered with a whitish pile; the clypeus, except narrowly round the apex, a mark, with its upper half broadly dilated, over the antennæ, a line round the eye incision, the outer orbits, broadly above, the mark gradually narrowed below, the base of thorax, the line extended broadly to the middle of propleuræ, tegulæ, two irregular marks on the scutellum, laterally extended at the apex to the wings, postscutellum, a large irregular mark on the sides of median segment, broad lines on the apices of the abdominal segments (that on the first broader and more irregular than the others) and a large conical mark on the top of the base of the mesopleuræ, followed below by a longer, narrower irregular stripe, pale yellow. Legs reddish fulvous, the coxæ, trochanters and base of femora black; the four anterior coxæ spotted with white below; the apex of the middle femora and the outerside of the four hinder tibiæ are broadly white. Wings hyaline, the costa and stigma dark fulvous, the nervures black. ♀. Total length 9 mm.

Head clearly wider than the thorax; the temples obliquely roundly narrowed; the occiput roundly incised. Clypeus much broader than long; its apex broadly projecting, transverse, red, with a black, irregular transverse line above. Front closely and strongly, the vertex weakly, the clypeus more strongly, sparsely punctured. Base of thorax transverse, with projecting angles. Base of postscutellum transverse, the apex more rounded. Thorax closely, strongly punctured, except on the metapleuræ, where it is smooth. Abdomen strongly and closely punctured; the first segment cup-shaped; its apex with the punctuation strong and sparse. Palpi long, broad, yellow, tinged with rufous; the hair very long, yellowish-white. Mandibles red, broadly yellow at the base; there are only two distinct teeth.

Oslar, Prescott, Arizona.

Rhygchium dorsale Fab.

A ♀ from Fedor, Texas, and another from Oslar, Berkeley, Col., agreeing with Saussure's figure on Pl. XIII, f. 9 (Vespides i). A ♂ from Fedor is very dark colored, the front, vertex, occiput, the greater part of the mesothorax and the abdomen, except the yellow apical margins, being black. It is very variable as regards coloration; the red basal three joints of the antennæ, fuscous violaceous wings and the yellow bands on the basal abdominal segments appear to be common to all the numerous varieties.

On some Undescribed American Hymenoptera chiefly from the Southwest of the United States.

BY P. CAMERON.

I am indebted to Prof. Carl F. Baker for most of the species described in this paper.

VESPIDÆ.

Polistes versicolor Fab.

Prof. Baker has a ♀ from Rio Branco, Obidos, Brazil, which agrees very well with Saussure's figure of his Var. D on Pl. VIII, f. 6, Vespides, ii. It is 18 mm. long. More variegated varieties (like that figured by Saussure on Pl. VII, f. 5, have been taken by Prof. Baker at Fedor, Texas, and Oslar, Patagonia Mountains, Arizona. I have a ♀ from Mexico, which agrees with Saussure's figure of *P. instabilis* Sauss. on Pl. XI, f. 1. I am, however, unable to separate it from *versicolor* type, beyond the fact that the pleuræ and sternum are black; but this, however, is the case with the Var. D of *versicolor* mentioned above. At present my opinion is that *instabilis* is only a form of *versicolor*, the latter being a most variable species as regards coloration; indeed, it is difficult to get two specimens colored alike. *P. instabilis* is not mentioned by recent writers on Vespidæ, *e. g.* Schulz and Ducke.

Polistes flavus Cresson.

This species (described in Trans. Am. Ent. Soc., 1868, p. 383) has been taken by Prof. Baker at Oslar, Negales, Arizona, and Tempe, Arizona. There is a female which is 24 mm. in length and two smaller specimens (probably workers) from 16 to 18 mm. The amount of fulvous color varies. In one example the mesonotum is rufous, with two yellow lines, united by a broader one at their apex, in its centre, there being also a yellow mark at the tegulæ. It is related to *carnifex:* the difference in the form of the clypeus separates the two: in *carnifex* it is distinctly longer than its greatest width, the part below the eyes being fully twice the length of the upper, oblique part; in *flavus* the clypeus is not much longer than broad, the lower part not being twice longer than the upper; the wings, too, are darker colored.

Polistes aurifer Saus.

This species has been taken by Prof. Baker at Oslar, Las Vegas, New Mexico; Oslar, Durango, Cala., and Ormsby Co., Nevada, including the undescribed male. The latter has the malar space as long as the third antennal joint; the clypeus is flat, distinctly longer than its greatest width; its apex is trilobate, the middle lobe being more prominent than the lateral; the upper bordering furrows are oblique, slightly curved and end at the bottom of the eyes; the upper transverse one is much less distinct; the frontal keel is broad, prominent, narrowed in the middle. The four anterior legs are yellow, except on the upper part of the femora. The third antennal joint is as long as the following two united; the apical are flat below, rounded above; the last thinner and about one-fourth. As in the ♀, the size of the yellow thoracic marking varies, as does also the rufous ones. One ♂ has two *Xenos* attached to the penultimate abdominal.

The two marks or lines on the metanotum may be absent or represented by two small spots.

EUMENIDÆ.

Ancistrocerus belizensis sp. nov.

Black, shining, covered with a short, white down; the clypeus, base of mandibles, a narrow interrupted line over the antennæ, a narrow line on the lower half of the eye incision, a small spot near the top of the outer orbits, a line, broadly interrupted in the middle, on the base of thorax, postscutellum, a broad curved line on the lower part of apical slope, an irregular spot on the pleuræ below the tegulæ, a line on the top of first abdominal segment, one all round on the apex of second, both of equal width, and the underside of antennal scape, whitish yellow. Femora and tibiæ tinged with fuscous below. Wings fuscous-violaceous, paler at the base, the nervures and stigma black; tegulæ black, with a small white spot at the apex. ♂. Length 7 mm.

Flagellum of antennæ brownish; it becomes distinctly thickened towards the apex; the last joint is thinner than the penultimate and ends in a slightly curved hook, a little narrowed towards the apex, and which is straight, not curved as usual. Clypeus longer than wide, strongly, but not closely punctured, the apex transverse. Base of thorax transverse, raised, the edges slightly projecting. Apex of postscutellum black, rounded. Sides of metanotum irregularly reticulated above; their centre roundly dilated, with a smaller projection below; the centre is depressed and closely transversely striated. Base of first abdominal segment with a strong keel, which below is continued along the sides to the apex. Second segment longer than wide, obliquely depressed at the base above; the apex in the centre above with a broad, raised band, which is clearly defined by a furrow at the base; the apex is bordered by a crenulated furrow; the basal segment is reddish below.

Belize (I. D. Johnson).

The form of the second abdominal segment shows an approach to that of *trituberculatus* Cam.; that species is larger, has the sides of metanotum keeled or margined all round, and the first abdominal segment wants the stout bordering keel on the base found in the present species.

Odynerus (Ancistrocerus) minnesotensis sp. nov.

Black; the clypeus, mandibles, except below and at the apex, a triangular small spot, dilated in the middle below, on the lower part of the front, a small spot on the outer orbits, near the top of the eyes, a band on apex of pronotum, narrowed in front, a triangular spot below the tegulæ, postscutellum, the first abdominal segment above, except its basal slope, its apical half below, the apical fourth of the second segment above, and more narrowly below, and the antennal scape, except the apical two-thirds above, red; the underside of the antennal flagellum pale orange-yellow; the legs of a lighter colored red than the red spots on the body; wings fusco-hyaline, the apex broadly fuscous-violaceous, the nervures and stigma black. ♂. Total length 7 mm.

Clypeus clearly longer than wide, sparsely, distinctly punctured; the apex with a rounded incision, wider than long; the top in the middle transverse, the sides oblique; the puncturation coarse and strong, the pubescence very sparse. Base of thorax transverse, the sides not projecting. Apex of postscutellum obliquely narrowed to a blunt point; the apical edge black. Prothorax and mesothorax strongly, closely punctured; there is a broad smooth longitudinal line on either side of the mesonotum near the apex. Base of metanotum distinctly punctured, but neither so closely nor so strongly as the mesonotum, the centre irregularly transversely reticulated, not much hollowed; the sides are broadly rounded; the lower lateral spines distinct, pale, longish triangular; the metapleuræ are more weakly and less closely punctured than the metanotum. First abdominal segment elongated cup-shaped; coarsely, closely punctured; the top of the apical slope with the punctures larger and more elongated, forming a more or less regular belt, bordered in the centre below by a curved, tripartite keel; the segment is narrower than the second, which is distinctly longer than it is wide at the apex; the latter is more strongly punctured than the rest, and is slightly, but distinctly reflexed; the other segments are more weakly punctured, except the last, which is smooth. Antennæ stout, becoming thicker towards the apex; the hook is black, stout, curved; its apex reaches to the base of the eleventh joint.

The base of the first abdominal segment is rounded above at the base; it is longer and squarer than usual on the apical part, the sides being straight, not rounded. The thorax is more than twice longer than wide. Tegulæ rufous testaceous.

Minnesota, United States.

Belongs to Saussure's Section B, *b*. (Syn. Am. Wasps, 198). The red marks are unusual; but they occur with *O. histrio* Lep., belonging to the above noted section of *Odynerus;* in that species the

metanotum is very strongly punctured—in the present species only very slightly—and is bordered all round by "very salient and trenchant ridges;" this species is stated, *l. c.* p. 209, to be distinct "by the strength of the ridges of the metathorax;" in *minnesotæensis* these can hardly be said to exist, either above or on the broadly rounded sides. Characteristic, too, of the species I have described is the very broad colored band on the apex of the first abdominal segment.

SPHEGIDÆ.

Trachypus annulitarsis sp. nov.

Black; the clypeus bright orange-yellow, a narrow pale line on the sides of the first abdominal segment at the apex, a larger one, curved, broad on the outerside, narrowed on the inner shortly beyond the middle of the second and an irregular curved line, narrowed in the middle, on its apex below, of a paler yellow color. Antennæ dull rufous brown below, the base of the scape yellowish. The apex of the anterior femora and the four anterior tibiæ below yellow; the second and third joints of the hind tarsi pale yellow, black at the apex. Wings hyaline, suffused with fuscous violaceous; the stigma dark fuscous, the nervures blacker. ♀. Length 17 mm.

Front closely, longitudinally striated, the striæ intermixing; the vertex shining, sparsely, weakly punctured. There is a pale yellow spot at the base of the mandibles; a reddish one near the apex. Pronotum and mesonotum smooth, shining, the basal half of the mesonotum with three wide, deep furrows, of which the central is the wider and deeper; there is a shallow furrow in the middle of pronotum. Basal region of metanotum bare, smooth, shining, the rest closely punctured, as are also, but less strongly, the pleuræ; the fovea large, rounded and widened at the apex, deep in the centre there. Propleuræ finely, closely obliquely striated. Mesopleuræ closely, distinctly, but not very closely punctured. Abdominal petiole about two-thirds of the length of the thorax.

The central lobe of clypeus depressed; the sides above forming tubercles. The second abscissa of the radius is about one-fourth longer than the third, longer compared with it than in *T. mexicanus*. There are two small, whitish-yellow spots on the apex of metanotum.

Allied to *T. mexicanus* Sauss.

MIMESIDÆ.

Psen coloradoensis sp. nov.

Black, the face and clypeus densely covered with silvery pubescence; the apex of clypeus broadly rounded, the hinder ocelli separated from each other by a slightly less distance than they are from the eyes; the metanotal area large, the lateral keels oblique, not uniting at the apex, which is narrow and transverse, and bearing a few irregular oblique striæ, the middle being smooth; the apical slope and the metapleuræ are stoutly reticulated. Abdominal petiole as long as the hind femora, of equal width throughout; there is a keel down its centre, the sides being also bordered by a keel. The recurrent nervures are received about the same distance from the base and apex of the second cubital

cellule—a slightly less distance than the front of the cellule; the second recurrent nervure is roundly curved backwards on the front three-fourths, the posterior part is straight and slightly oblique. ♀. Length 8 mm.

Front and vertex closely, distinctly punctured, the puncturation weaker on the outerside of the vertex; there is a narrow, but distinct keel down the lower half of the front; the pubescence is longish, not very close and silvery. Mesonotum somewhat strongly and closely punctured in the middle, the sides almost smooth. Scutellum almost smooth, the postscutellum shagreened. Propleuræ and mesopleuræ shagreened; the metapleuræ somewhat widely reticulated. Legs covered thickly with white pubescence; the hind tibiæ are distinctly spinose behind; the calcaria white; the four anterior tarsi are tinged with testaceous. Underside of flagellum fuscous. Pygidium depressed somewhat, covered with large, clearly separated punctures, not acute at apex, about one-fourth longer than it is wide at the base; it is not distinctly margined laterally.

Berkeley Co., Colorado; June.

Except that the pygidium can hardly be called "acute at apex," this species would come into Mr. Fox's Group 2 (Trans. Am. Ent. Soc., XXV, 5), and in the table, on p. 2, it certainly runs near to *cylindricus* and *regularis* of that group. It is a *Mimesa*.

Closely allied to the above is a species I have from New Mexico. The main differences between the two may be shown thus:

The second recurrent nervure not interstitial, broadly roundly curved in front; the front with a distinct keel; the abdominal petiole not much shorter than the hind femora..... **coloradoensis.**

The second recurrent nervure interstitial, at the top straight, oblique, bent backwards, forming a sharp angle with the rounded lower part, the front without a distinct keel, the abdominal petiole distinctly shorter than the femora..... **interstitialis.**

Psen interstitialis sp. nov.

Face and clypeus densely covered with a silvery pubescence, the apex of the latter broadly rounded. Hind ocelli separated from each other by a distinctly less distance than they are from the eyes; the anterior is surrounded by a smooth furrow which goes down the front for a short distance; the punctuation is weak, not very distinct; the pubescence silvery, moderately long and dense. Prothorax and mesothorax almost smooth; the metanotum and metapleuræ at the base reticulated; the area large, not narrowed to a point at the apex; the sides and apex smooth, the centre with four or five stout, oblique keels. Legs densely covered with silvery pubescence, all the tarsi rufo-testaceous, the calcaria white; the tibiæ weakly spinose. Abdominal petiole stout, not dilated at the apex; the top in the centre raised, the sides furrowed near the base. ♂. Length 8 mm.

The first recurrent nervure is received the length of the second abscissa of the radius from the base of the cellule. Pygidium smooth, triangular. The antennæ are as long as the head and thorax united; the flagellum is entirely brown. The base of the metapleuræ is almost smooth, the rest distinctly, somewhat strongly obliquely striated.

New Mexico.

This species is closely allied to *P. coloradoensis* described above. I at first thought that it might be its ♂; but the interstitial second recurrent nervure and its very different form precludes one from regarding them as the sexes of one species. The second cubital cellule is smaller, especially behind, than it is in *coloradoensis;* in the latter the second abscissa of the cubitus is more than half the length of the third; in the present species it is not half its length.

PEMPHREDONIDÆ.

Pemphredon tinctipennis sp. nov.

Black, densely covered with long pale pubescence; wings hyaline to the transverse basal nervure, distinctly tinged with fuscous beyond, iridescent, the nervures and stigma black; abdominal petiole slightly longer than the dilated apical part, as long as the hind coxæ and trochanters united, stout, curved, above coarsely rugosely punctured, the apex with a furrow down the middle, the sides broadly furrowed down the centre, the furrow clearly defined; the pygidium triangular, strongly, closely punctured laterally, the middle bordered by stout keels, forming an area of equal width, with three round foveæ in the centre. Apex of clypeus broadly rounded. Ocelli ·.·, close together, the hinder separated from each other by about half the distance they are from the eyes. Apex of clypeus broadly rounded. Metanotal area large, covered with stout, curved, mostly longitudinal striæ, which become finer towards the apex. Mesonotum closely, finely, transversely striated at the base, the rest much more strongly transversely striated; mixed with punctures in the middle at the apex. Clypeus with fine, clearly separated punctures. Front closely, almost rugosely punctured, with a smoother, semicircular depression over the antennæ. Pronotum and mesonotum closely rugosely punctured, the latter with a fine longitudinal furrow down the sides; the scutellum is more coarsely punctured, more or less striated in the middle; the postscutellum is more finely punctured; the apical slope of the metanotum is irregularly punctured-striated and with a wide, deep furrow down the middle. Propleuræ not very strongly or closely punctured, striated in the middle. Mesopleuræ closely, rugosely punctured, almost reticulated in front; a distinct, curved, crenulated furrow on the lower basal half. Metapleuræ almost smooth at the base, the middle with shallow, distinctly separated punctures, the apex reticulated. Apex of middle tibiæ with reddish spines at the apex; the hinder with a few short, stumpy black spines. Temples wide, occiput transverse. ♀. Length 11 mm.

The second cubital cellule is large, almost square, receiving the recurrent nervure at the apex of the basal fourth; the first recurrent nervure is received shortly beyond the middle of the cellule; the cubitus behind it being roundly curved towards the costa. The abdomen behind the petiole is longish-ovate.

Arizona. In my collection.

This species I at first concluded might be *P. concolor* Say. *P. morio* Cress. is considered by Mr. Cresson (Trans. Am. Ent. Soc., 1887, p. 283, supp.) to be identical with *concolor;* a comparison of

the description of *morio* (Trans. Am. Ent. Soc., 1865, p. 486) shows that the present species cannot be *concolor*; *e. g.* in that species the abdominal petiole is one-half of the rest of the abdomen, which is called "broadly ovate"; in *tinctipennis* the petiole is not one-fourth of the length of the abdomen, which is, moreover, longish ovate.

Passaloecus mandibularis Cress.

Pemphredon mandibularis Cresson, Proc. Ent. Soc. Phil., iv, 487.

Three Rivers, California.

BEMBECIDÆ.

Monedula denvereusis sp. nov.

Lemon-yellow, the head paler; the upperside of the flagellum of antennæ, the occiput except round the edged, a band on the outer edge of the vertex behind the ocelli from the outer edge of which a stripe runs down near to the antennæ, its upper (and smaller) part being oblique, narrowed below, the lower runs straight down, is wider, is straight on the outer side, roundly narrowed on the inner, a large mark in the centre of the pronotum at the base, the apex of which has three small dilations, a narrow line runs from its base to the outer edge, the mesonotum except the sides and two longitudinal lines in the middle, narrowed towards the apex; a broad line, dilated laterally on the apex of the scutellum, a narrow line on its apex, a curved line on the base of metanotum from the outer edge of which a line runs obliquely to the apex, in the centre of which the two lines unite, a line down the apex of the mesopleuræ, a line down the base of the metapleuræ, this line being prolonged towards the middle below, the basal slope of the first abdominal segment, its middle at the apex narrowed into a large squarish mark, with the outer apical edges produced outwardly, the base of the second, third and fourth segments broadly, the line on the second shortly dilated in the middle, with a transverse line, more than three times its length at the end; the line on the third is broadly dilated in the middle, this part having a square incision in the middle of the apex, the outer edges of the mark being dilated outwardly at the apex, a broad line, roundly incised in the middle, at the apex on the fourth and fifth, the apices of the basal three segments and irregular bands on the apices of the third to fifth apical segments, black; the centre of the second dorsal behind the transverse line, the apical half of the third and irregular spots in the centre of the fourth and fifth rufous. Legs of a brighter yellow color than the body, the basal half of the femora broadly black above. Wings clear hyaline, the nervures and stigma fulvous. ♀. Length 14 mm.

Head and thorax covered with white pubescence, that on the head the longer. A longish, wide furrow above the ocellus, which is bordered and longer than wide, rounded behind. Upper part of the body closely, minutely punctured. Second cubital cellule square, of equal width, the nervures parallel. Pygidium strongly, distinctly, but not very closely punctured. Wings as long as the head and thorax united.

Denver, Colorado.

This species is related to *M. speciosa* Cress. The differences between the two may be expressed thus:

A U-shaped mark on mesonotum, alar nervures black; the second cubital cellule narrowed in front, ocellus in a large depression with obliquely sloped sides, the furrow above it narrow; breast with two large black marks, the narrowed apical part of the black band on the basal abdominal segment narrowed to a point at the apex. . . . **speciosa** Cress.

Two yellow lines on mesonotum, not united at the apex, the alar nervures fulvous; the second cubital cellule not narrowed in front; square, ocellus not in a large depression, the upper furrow wide, deep, breast immaculate, the apex of the black mark on first abdominal segment not narrowed, its sides projecting outwardly . . . . . **denveremsis.**

Monedula speciosa Cress.

Black; the clypeus, labrum, mandibles except at the apex, a narrow line on the outer orbits, the face except for two oblique lines on the top, extending to the middle, these lines being roundly narrowed on the innerside at the base and rounded at the apex, the prothorax except broadly at the base and for a lateral line, roundly narrowed above, a short line at the tegulæ, an interrupted broad line on the scutellum, a narrow curved line on the postscutellum, an irregular, narrow, more or less interrupted, line round the apex of metanotum, a large broad mark, covering the mesopleuræ, except for a triangular mark in the centre of the apex below, a narrow line on the apex above and a line round the posterior part of the tubercles, the breasts, the metapleuræ except the base and a broad line behind and below the spiracles, the yellow at the apex extending irregularly on to the metanotum, a large mark, roundly narrowed on the innerside, on the sides of the first abdominal segment, a larger mark, not narrowed, on the second, a narrower, shorter one on the third; a shorter, slightly broader one on the fourth and fifth, an irregular spot, one-third the length of that on the fifth, on the sixth, the apical third of the seventh, two separated transverse marks on the centre of the second and third, two united ones on the fourth and fifth, a triangular one on the sixth, the greater part of the first ventral, an irregular large bisinuated mark along the sides of the second, the apex prolonged to near the centre, a triangular mark on the sides of the third, an irregular mark on the fourth and a smaller regular one of equal width on the sixth, yellow. Legs yellow, the femora with a broad black line above; the apical joint of the four anterior tarsi and the apical four of the hinder, black. Wings hyaline, the nervures black. ♂. Length 23 mm.

On the middle femora there is a basal spine, followed by three larger ones, of which the middle is the stouter and longer and it is bifid at the apex; following these are three shorter, thinner teeth, which become successively shorter. The basal three joints of the fore tarsi are of equal width; the fourth is shorter and dilated on the innerside; the last is as long as the preceding three united, is greatly dilated, becoming gradually widened from the base to the apex, which is almost transverse; the inner claw is roundly dilated on the inner basal half. Basal half of pygidium punctured closely and strongly, the apex smooth; the segment is broad at the base and becomes gradually roundly narrowed to a blunt, rounded point. The apical half of the central spine of the armature is white.

The flagellum of antennæ is entirely black; the scape clear yellow. Tibiæ distinctly spinose; the spine on the apex of the middle is brown, stout. Basal joint of middle tarsi broadly, roundly incised; at the base of the incision are three long, stout spines, the apical the larger. There is a narrow, not deep, incision at

the base of the anterior metatarsus; it is fringed below with long white hair; the other joints have white spines on both sides; this being also the case with the other legs. I should think that the femoral spines vary in number and form; they are not the same in the same specimen. The wings are not twice longer than the thorax. Second ventral segment not dentate.

Fedor, Texas.

Characteristic is the flat dilated apical joint of the fore tarsi, with the peculiar dilated inner claw. As the structural peculiarities of the male have not been described by American writers, the above description may be useful in helping to identify the species, which, so far as coloration is concerned, is very variable.

Bembex spinolæ Lep.

Sapello Canon, Las Vegas, New Mexico; Berkeley, Colorado; Three Rivers, California.

Steniola scolopacea Hand.

Huachuca Mountains, Arizona.

Steniola obliqua Cress.

Durango, Colorado.

Bembidula ventralis Say.

Sapello Canon, New Mexico.

SCOLIIDÆ.

Plesia (Myzine) nigropilosella sp. nov.

Black, densely covered all over with black pubescence, the wings uniformly dark fuscous-violaceous, the nervures and stigma black; the head, prothorax and mesothorax strongly, but not closely punctured, the front more closely and rugosely than the vertex, the median segment much more closely, strongly rugosely punctured; the mesonotum and scutellum with only large, scattered punctures; the centre of the former raised slightly, the raised part bordered by a crenulated furrow, the centre with a furrow formed of deep punctures, close together; the sides, except at the base and apex, are bordered by an almost impunctate furrow; the part between these and the tegulæ smooth. Clypeus raised in the centre, narrowed towards the apex, which is depressed and transverse; the puncturation deep, the punctures large, clearly separated. Sides of metanotum broadly rounded, the centre depressed. Abdomen smooth, shining. Pleuræ, except the lower part of the metapleuræ, strongly, closely punctured. The second and third abscissæ of radius almost equal in length; the lower part of first transverse cubital nervure straight, bullated at its junction with the cubitus; the first recurrent nervure is received shortly beyond, the second more distinctly behind the middle of the cellule; the third transverse cubital nervure roundly curved. Tarsi tinged with brown. ♀. Length 16 mm.

Gallinas Canon, New Mexico (Oslar).

Plesia granadaensis sp. nov.

Black, with the following yellow markings; two almost united marks over the antennæ, broadly rounded above and narrowed there to a blunt point which reaches close to the line on the orbits, a line on the inner orbits, commencing shortly above the eyes and distinctly dilated below, the two not converging above, a line on the outer orbits, commencing in the centre, and running obliquely to the eyes, an elongated oval, oblique mark on the sides of pronotum at the base, the lower side of the mark straight, narrowed and produced, the apex of the pronotum, a transverse mark, narrowed behind, in the centre of the of the mesonotum, a short one, narrowed towards the base, at the sides, close to the tegulæ, postscutellum, a line on the sides of the apical three-fourths of the metanotum, narrowed towards the base and united at the apex to a similar mark on the apex of the metapleuræ, a longish line on the base of the mesopleuræ, rounded above, gradually narrowed on the lowerside; two marks, slightly longer than wide, gradually narrowed at the base, from above downwards, the lower part narrowed to a blunt point, on the sides of the first abdominal segment, two curved transverse marks, widened on the inner sides, the apical edge irregular and nearly twice the length of the apex of the basal marks on the sides of the second and bands on the base of the following three segments, narrowed in the middle, and becoming successively narrower, the third line being not one-fourth of the length of the first; a small spot on the sides of the second ventral and two broad longish lines on the third; the apex of the clypeus, the mandibles, except at the apex, and the sides and the apex of the pygidium are rufous. Legs black, the tibiæ reddish on the outerside, the anterior with a larger yellow line in front; they are covered with long white hair, the calcaria being also white. Wings hyaline, iridescent, the radial and the fore part of the cubital cellules smoky; the nervures and stigma black. ♀. Length 8 mm.

Head, thorax and base of abdomen thickly covered with long white hair, shining; the front and vertex strongly and closely, the mesonotum and scutellum nearly as strongly, but not so closely, punctured; the metanotum aciculated, irregularly punctured in the middle; the apical slope almost smooth, more shining than the rest. Propleuræ and metapleuræ, except above, closely, obliquely and somewhat strongly punctured; the mesopleuræ strongly, but not closely, punctured. Abdomen shining, punctured, weakly at the base, more strongly towards the apex. Pygidium strongly, regularly longitudinally striated. Apex of antennal scape reddish, tinged with yellow; the flagellum reddish-brown below.

What is doubtless the ♂ is of the same size and is from the same locality; the clypeus, mandibles, except at the apex, the lower half of the inner orbits, a curved mark over the antennæ, two broad, curved lines almost touching above on the base of the prothorax, its apex somewhat broadly, a large mark on the apex of the scutellum, transverse at the base, rounded at the apex, postscutellum, a broad line on the sides of the apex of the metanotum, broadly dilated below on to the pleuræ, base of mesopleuræ broadly, a conical mark on the apex below, the apices of the basal six abdominal segments above and marks on the sides of the ventral, bright lemon-yellow. Legs bright lemon-yellow, the coxæ, trochanters and base of femora broadly—the posterior femora less broadly than the others—black. Wings hyaline, the stigma testaceous, the nervures black. Strongly, closely punctured, the metathorax more closely and regularly than

the mesonotum; the abdomen shining, impunctate. The incision on the apical abdominal segment is rounded at the base and is clearly longer than it is wide at the apex. The apex of the hind tibiæ broadly and of the tarsal joints narrowly are rufous.

Granada, Nicaragua (Baker).

This species cannot readily be confounded with any of the recorded Central American species.

Plesia fulvinervis sp. nov.

Black; a broad irregular transverse band on the front above the antennæ, from the outer edge of which a line, half the width, runs along the orbits to shortly beyond the eyes, the pronotum, except for an oblique black line on the sides of the basal slope, the yellow extending broadly on to the base of the pleuræ, a a large mark, longer than wide, transverse at the base, roundly, broadly narrowed at the apex, a broad transverse mark on the scutellum, transverse at the base, the apex broadly rounded, a broad line opposite the tegulæ, rounded and narrowed at the base, postscutellum, the base of the scutellar keels, a longitudinal mark, half on the basal, half on the apical slope of the metanotum, narrowed to a sharp point at the base and apex, a large mark on the sides of metanotum and apex of metapleuræ, the part on the metanotum being largely, triangularly produced above beyond the outer, a large mark on the base of the mesopleuræ, the upper apical half dilated, a broad band on the apical half of the first abdominal segment, not extending to the extreme apex which is black, the second and third segments except at the apex, a broad band, dilated laterally at the apex, in the centre of the fourth, the fifth, except narrowly and irregularly at the apex, the sides of the second ventral broadly, a large mark on the sides of the third, the second almost meeting in the centre and dilated laterally at the apex, and somewhat similar, but more irregular marks, on the fourth, bright lemon-yellow. Legs black, the apex of the fore femora broadly below, the fore tibiæ in front, except at the apex, the middle tibiæ more broadly in front and the middle of the posterior yellow; the calcaria and tarsal spines white; the apices of the tarsal joints red. Wings hyaline, slightly fulvous in front at the apex, the nervures and stigma fulvous; the second abscissa of the radius distinctly longer than the basal or apical, the latter being slightly longer than the apical; the first recurrent nervure is received distinctly beyond the middle, the second at the apex of the basal third of the cellule. ♀. Length 13–14 mm.

Head, thorax and base of abdomen covered with long white hair; the hair on oral region and apex of mandibles rufous. Head, prothorax and mesothorax strongly and somewhat closely punctured; the base of metanotum strongly, irregularly, the apical slope more closely, regularly and finely transversely striated. Base and upper part of propleuræ finely, closely, obliquely striated, mesopleuræ strongly punctured; the metapleuræ weakly, irregularly obliquely striated. The second, third and fourth abdominal segments are sparsely, weakly punctured in the middle; the pygidium closely, regularly longitudinally striated.

Oslar, Berkeley Co., Colorado.

May be known readily from *P. spilonota* by the fulvous colored alar nervures, by the middle abscissa of the radius being distinctly longer than the others, and by the wings not being broadly fuscous in front.

Plesia spilonota sp. nov.

Black; a narrow line on the inner orbits, commencing opposite the antennæ and continued shortly beyond the eyes, a large band on the sides of the pronotum above the basal slope, roundly narrowed behind, transverse in front, a large mark in the middle of the mesonotum, its base roundly incised, its sides straight, oblique, narrowed towards the apex, a broad line opposite the tegulæ, postscutellum, a mark on the centre of the basal half of the metanotum, the base slightly projecting in the middle behind, gradually, roundly narrowed, the apex produced into a narrow point, half the length of the dilated base, a broad line on the apical three-fourths of the sides, its outerside straight, the inner rounded, gradually narrowed towards the top, from near the apical part another line runs obliquely upwards to shortly above its middle; this part becomes gradually obliquely narrowed towards the top; the lower part of both is broadly, roundly incised; a large broad line on the base of the mesopleuræ, extending below the middle, the top bluntly rounded above; from there it becomes gradually widened to a blunt point, from which it becomes gradually narrowed below, this lower narrowed part being longer than the upper, two large irregular marks, dilated on the innerside at the base, two large marks on the sides of the second segment, occupying the basal two-thirds, roundly narrowed on the innerside and united at the base by a straight line, a line on the basal half of the third, with a broad, shallow incision in the middle and similar bands on the following two segments, less deeply incised in the middle, a longitudinal line on the second ventral and broad transverse lines on the sides of the following two segments, bright lemon-yellow. Legs black, a large yellow mark on the base of the hinder coxæ: the tarsi are for the greater part rufous. Wings almost hyaline, the radial and cubital cellules smoky, the nervures and stigma black. ♀. Length 16 mm.

Head, prothorax and mesothorax, base, sides and ventral surface of abdomen and the legs covered, but not thickly, with long white hair, the tarsal spines tinged with rufous; the calcaria white. Apex of clypeus fringed with short red hair. Head closely and strongly punctured, the face and clypeus less strongly than the rest. Pronotum strongly, coarsely punctured; the propleuræ closely, uniformly, strongly obliquely striated; the base and apical two-thirds of the middle lobe of the mesonotum smooth; the base of the latter, the lateral lobes, except at the base and the scutellum, except in the centre at the base, strongly, but not closely punctured. Postscutellum smooth. Metanotum strongly aciculated, the apex sparsely punctured. Mesopleuræ strongly punctured. Metapleuræ, except at the base, closely obliquely striated. Basal three abdominal segments smooth in the middle, the sides sparsely punctured; the apical are more strongly punctured all over; the pygidium closely strongly striated, except round the edges, which are rufous. The basal abscissa of the radius is slightly longer than the others, which are almost equal in length; the first recurrent nervure is received shortly beyond, the second shortly behind the middle.

Oslar, Gallinas Canon, New Mexico.

MUTILLIDÆ.

Dimorphomutilla ? belizensis sp. nov.

Black; the entire body and legs densely covered with long white hair, the calcaria white, the tarsal spines blackish; wings fuscous-violaceous, the nervures and stigma black; the radius roundly curved, not reaching half-way, between

the stigma and the apex; the radial cellule forming almost a semi-circle; the first transverse bullated below, obliquely sloped, more so than the second, which is as stout as it; the others are faint, thin. Head distinctly, but not closely or strongly punctured; the front finely furrowed down the middle. Antennal tubercles large, bare, shining. Mandibles slightly reddish near the middle. Thorax more strongly, but not any more closely punctured than the head; more sparsely at the apex of the mesonotum in the middle. Scutellum rugosely punctured. Metanotum reticulated. Propleuræ impunctate, bare below; the mesopleuræ distinctly punctured, except at the apex, which is smooth, bare and shining, as is also the base of metapleuræ, the rest of the latter being reticulated, but not so strongly as the metanotum. Abdomen shining, smooth; the basal two segments sparsely, the others thickly covered with long white hair; the apical having also some black ones in the middle; the pygidium is more opaque, rougher and brownish at the apex. ♂. Length 5 mm.

Antennal scape punctured, not hollowed below, as long as the following two joints united; the third joint narrowed at the base; not quite as long as the fourth. There is no distinct areola on the base of metanotum. The abdominal petiole becomes gradually wider from the base to the apex, which is not clearly separated from the base of the second; the segments are not keeled in the middle. Eyes shining, not strongly facetted, ovate; there is a distinct malar space. Head rounded in front, transverse behind, the angles rounded.

Belize (I. D. Johnston).

ICHNEUMONIDÆ.

ICHNEUMONINI.

Ichneumon clarimontis sp. nov.

Black, with the following parts red: the base of the post-petiole and the rest of the abdomen, a large squarish mark in the centre of the mesonotum, extending beyond the apex of the tegulæ and with the sides continued as moderately broad lines to near the base, the second lateral areæ on the metanotum, the greater part of middle femora, of the hind coxæ, the hinder femora and the apical half of the hind tibiæ; bright yellow are: the clypeus, labrum, mandibles, except at apex, the upper and inner orbits, the lower and the lower part of the outer shortly, a line on the upper part of prothorax, two spots on the lower edge, tegulæ, tubercles, the centre of the mark on the pronotum, the greater part of the scutellum, apex of areola, the second lateral areæ, the spiracular, except at the base, the apices of the abdominal segments, the ventral keel, the four anterior legs, except the femora, the apex of the hind coxæ, trochanters and the base of the hind coxæ broadly black below. Antennæ black, the scape yellow, black above. Wings hyaline, the costa and nervures black, the stigma dark fulvous. ♂. Length 15 mm.

Antennæ distinctly tapering towards the apex, not serrate. Head, thorax and coxæ densely covered with white pubescence, closely, but not strongly punctured, except over each antennæ, where there is a smooth, bare, shining depression, the metanotum more strongly punctured than the rest, the posterior median area coarsely, closely transversely striated. Areola large, horse-shoe shaped, longer than wide, the base transverse in the middle, the apex rounded inwardly. Postpetiole depressed in the centre, closely, somewhat strongly striated; the sides sparsely punctured on the inner, striated on the outerside. Gastræ-cœli deep.

striated strongly, black in the centre. Tarsi closely, stoutly spinose. There is a minute stump on the disco-cubital nervure and a long one on the recurrent, which is received shortly beyond the middle.

Claremont, California (Baker).

The basal lateral areæ of the metanotum are separated; the basal is punctured distinctly, the apical is closely strongly transversely striated. There are black lines on the base of the middle segments of the abdomen.

Pseudamblyteles ormsbyensis sp. nov.

Rufous; the front and vertex broadly in the middle, the occiput, the flagellum of antennæ, the scape above, the lower half of prothorax and the pronotum at the base, a line round the mesonotum, the parts surrounding the scutellums, a line at the base of the third, fourth and fifth abdominal segments, not extending to the outer edges, the breasts, the upper part of the mesopleuræ, the lower more narrowly, the base still more narrowly, and the base and lower part of metapleuræ, broadly, black; the face, clypeus, greater part of mandibles, a line on the inner orbits, edged on the innerside with red; base of pronotum, a triangular spot on its apex above, tubercles, base of tegulæ and scutellum, bright yellow. Legs colored like the body, the four anterior coxæ and trochanters largely tinged with yellow; the apex of the hind femora, of the tibiæ more broadly and the apical joint of their tarsi, black. Wings hyaline, suffused with fuscous, the costa and stigma fulvous, the nervures black. ♂. Length 13 mm.

Areola about one-fourth wider than long, of equal width, transverse at the base, slightly rounded inwardly at the apex, the lateral areæ appearing separated from the basal, being much less strongly punctured than the apical. Head, thorax and coxæ densely covered with pale pubescence, closely punctured, the metanotum more strongly than the rest, the sides of the areola closely, finely obliquely striated; the posterior median area closely rugosely punctured, the lateral apical areæ stoutly striated; the spiracular somewhat closely, strongly, obliquely striated. Post-petiole finely, closely striated in the middle, the sides stoutly punctured. Gastræœli and the space between stoutly striated.

Ormsby Co., Nevada; July (Baker).

The transverse median nervure is received beyond the transverse basal; the disco-cubital has a long stump. Apical joints of antennæ serrate. Temples long, sharply oblique.

Pseudamblyteles peroratus sp. nov.

Black; the second and third abdominal segments, almost the apical half of the fourth, the apex of the penultimate and the last, ferruginous; the legs of a paler ferruginous, the coxæ, trochanters, the apex of hind tibiæ broadly, the apex of the basal joint of the hind tarsi narrowly and the greater part of the others black. Wings hyaline, the stigma testaceous, the nervures black. ♂. Length 8 mm.

Face opaque, impunctate, the clypeus smoother and more shining. Labrum rufous. Palpi dark testaceous, darker at the base. Front and vertex weakly,

indistinctly punctured. Prothorax and mesothorax weakly, but distinctly punctured, the punctures clearly punctured, Metanotum more opaque, shagreened, the apical slope almost transversely striated; the areola horse-shoe shaped, as long as wide, the apex slightly turned inwardly. Post-petiole somewhat strongly closely longitudinally striated. Areolet five-angled, the recurrent nervure received shortly beyond the middle; transverse median nervure received shortly beyond the transverse basal; disco-cubital unbroken. Flagellum of antennæ brownish below.

Ormsby Co., Nevada (Baker).

CRYPTINÆ.

STICTOCRYPTUS gen. nov.

Wings fuscous, fasciate with yellow; the transverse median nervure in hind wings broken below the middle; areolet square, not narrowed in front, angled below, the radial cellule small; disco-cubital nervure unbroken. Metanotum rugosely punctured and irregularly striated; there are two distinct transverse keels; the spiracles are about three times longer than wide. Abdominal petiole long, in ♀ slightly, in ♂ hardly dilated at the apex; curved. Antennæ in ♀ short, dilated beyond the middle, the third joint as long as the fourth; in ♂ slightly longer than it, longer and more narrowed; in both sexes they are orange-yellow at the base, black at the apex. Head lengthened in front; malar space long; clypeus separated; labrum large; temples wide, obliquely narrowed. Body blue, immaculate. The median segment has an oblique slope. The transverse median nervure is received almost behind the transverse basal.

Allied to *Joppidium* Walsh. Characteristic are the blue, strongly punctured body, dark wings with wide fascia, strongly reticulated-striated metanotum with two keels and steeply sloped apex, short square areolet, short radial cellule and slender abdominal petiole. The ♀ of the latter has the antennæ stouter at the apex than it is in *Joppidium*, but in the males of the two genera there is not much difference in length or thickness at the apex. *Joppidium* has the apex of the metanotum rounded; it bears only one keel, and the transverse median nervure in the hind wings is broken at the middle. There is not much difference in the form of the antennæ in the two genera. In Prof. Schmiedeknecht's arrangement (Opus. Ich. 416) my genus runs near to *Osprynchotus* and *Etha*.

Type *Cryptus fasciatipennis* Bé. from Cuba.

HEMITELINI.

Otacustes nigro-ornatus sp. nov.

Reddish, the antennæ paler; the basal half of metanotum, the apical slope broadly in the middle and the fifth and following segments of the abdomen black; legs colored like the body, the hind tibiæ and tarsi somewhat infuscated; wings hyaline, a band as wide as the stigma, narrowed in front, on eitherside of the transverse basal and median nervures, and a wider fuscous cloud commencing near the base of the stigma (which is white) and ending at the apex of the radius and with a small hyaline cloud at the upper half of the apex of the stigma; the nervures and stigma, except at the base, black. ♀. Length 5 mm.; terebra 1 mm.

Face distinctly shagreened, the clypeus less strongly so, clearly separated; the front and vertex distinctly shagreened; the ocelli in a triangle, the hinder separated from each other by about the same distance as they are from the eyes. Mandibles largely tinged with yellow. Palpi black. Mesonotum shagreened, darker on the apical half. Metanotum shagreened, the apical slope smooth and shining; near the base is a transverse keel, which projects backwards in a triangle in the middle; there is a semicircular keel round the top of the apical slope, which has a straight, oblique slope; the metapleuræ more shining and smoother than the rest. First abdominal segment shagreened, blackish at the apex; the second less strongly and the third still more weakly shagreened; the others smooth and shining. Basal abscissa of radius straight, the apical (and larger) curved; the cubitus slopes down obliquely to unite with the recurrent nervure. There are at least nineteen joints in the antennæ; the apical unfortunately are missing; the elongated basal two joints of the antennæ are equal in length; the third is slightly shorter.

San Mateo Co., California (Baker).

Allied to *O. periliti* Ashm., from the District of Columbia.

PHYGADEUONINI.

Stiboscopus erythrostomus sp. nov.

Black; the antennæ, clypeus, labrum, mandibles and the second and third segments of the abdomen, red; the antennæ darker colored towards the apex; the apical segment of the abdomen white; wings hyaline, the stigma and nervures fuscous; tegulæ white. ♀. Length 5 mm.; ovipositor nearly 1 mm.

Face finely, but distinctly punctured in the centre; the clypeus obscurely, finely punctured above, the rest smooth; the front and vertex shagreened. The mesonotum closely punctured, more weakly round the edges, the punctures distinctly separated; the scutellum is as distinctly, but less strongly, punctured. Metanotum opaque, coarsely shagreened, almost punctured. Pleuræ closely punctured, more closely than the mesonotum, almost rugose. Abdomen clearly longer than the head and thorax united, smooth, shining, the middle segments obscurely shagreened; the ventral surface is of a duller red than the top band; the ovipositor distinctly projects.

Mountains near Claremont, California (Baker).

This species agrees very well with the definition of *Stiboscopus* given by Prof. Schmiedeknecht in his admirable "Opuscula Ichneumonologia," p. 606, but differs in one respect from that of Ashmead

(Bull. U. S. Nat. Mus., xxiii, 28), in that the transverse median nervure in the hind wing is unbroked. In *S. latibalteatus* the areola is longish, horse-shoe shaped, clearly defined; the basal area and the two lateral ones are distinct; the areolet is clearly angled in the middle, where it receives the recurrent nervure. The antennæ are 22-jointed; the first joint of the flagellum is a little longer than the second.

Bathymetis testaceicornis sp. nov.

Black, shining, the antennæ reddish-testaceous, the tegulæ white; the sides of the second abdominal segment, the apex narrowly and the base still more narrowly, the apex of the third and fourth narrowly, the second to fourth ventral and the legs rufous; the wings hyaline, the stigma fuscous, narrowly white at the base, the nervures darker colored. ♀. Length 4.5 mm.

Head shining, covered with short fuscous pubescence; closely distinctly punctured, the punctures clearly separated, the face less strongly than the front; the clypeus smooth. Prothorax and mesothorax weakly, closely punctured, the pleuræ less strongly than the rest. Metathorax distinctly, closely punctured; the apical basal areæ more strongly than the rest; the apex round the edges above striated, the striæ clearly separated, the space between them smooth and shining. Basal segments of abdomen weakly punctured.

Ormsby Co., Nevada; July (Baker).

The areolet is angled below in the middle, where it receives the recurrent nervure. The areola is comparatively large, slightly longer than wide, horse shoe shaped, the apex slightly turned inwardly. The antennæ are stout, 21-jointed.

CAMPOPLEGINI.

Eriborus ? triannulatus sp. nov.

Black; the face and clypeus densely covered with silvery pubescence; the legs rufous, the four anterior coxæ, trochanters and tarsi, a narrow band on the base of the hind tibiæ, a broad one in the centre (equal in length to one-third of the tibiæ), and the basal joint of the hind tarsi white, the rest of the hind tibiæ and tarsi fuscous-black, except the second joint of the hind tarsi narrowly at the base and apex, where it is paler. Wings hyaline, the stigma fuscous, the nervures darker colored. The middle segment of the abdomen are narrowly lined with pale rufous at the apex. ♂. Length 3 mm.

Face opaque, finely shagreened, as are also, but less strongly, the front and vertex. Thorax opaque, the metanotum regularly areolated, the areola distinctly defined above, its base narrowed obliquely to a point, its apex open; the posterior median area rather strongly, closely, transversely striated. Antennæ covered with a close microscopic pile; the first joint of flagellum slightly, but distinctly longer than the second. Radial cellule wide, the basal abscissa of radius oblique, not half the length of the second, which is broadly, roundly curved; the transbasal nervure interstitial; the disco-cubital nervure is rounded; all the apical nervures in the hind wings are obsolete.

Santa Clara Co., California (Baker).

OPHIONINÆ.

Pristomeridia sulcata sp. nov.

Rufous; the eye orbits and basal half of the first abdominal segment pallid yellow; the rest of the first segment, the second and third above, the apex of the penultimate and almost the whole of the last, black. Flagellum of antennæ fuscous, darker towards the apex. Four front legs pale yellow, the hinder pale rufous, the apex of the femora and the spine pale yellow, the basal and apical fifth of the hind femora black, the tarsi fuscous. Wings hyaline, the nervures and stigma fuscous. ♀. Length 6 mm.

Shining, impunctate, glabrous, the apex of metanotum distinctly, transversely striated beyond the keel; the areola fully four times longer than wide, rounded at the base, becoming gradually slightly narrowed towards the apex, which is transverse; there are three basal areæ, the central small, longer than wide, the lateral large, wider than long; the sides and apex of the metanotum are bordered by a keel. Areolet small, oblique, of equal width, shortly appendiculated, receiving the recurrent nervure at the apex. Femoral tooth oblique, twice longer than it is wide at the base, narrowed towards the apex. Ovipositor projecting, longer than the last segment, broad. Parapsidal furrows distinct. There is also an oblique, short wide furrow on the base of the mesosternum on the sides.

Chinandegas, Nicaragua (Baker).

In having a distinct areolet this species differs from typical *Pristomeridia*.

Pristomeridia nigro-ornata sp. nov.

Rufotestaceous, the sides of the face, clypeus, orbits narrowly and basal half of petiole, pale yellow; the ocellar region, middle lobe of mesonotum, metanotum, apex of first abdominal segment and the greater part of the others, black. Legs pallid yellow. Wings hyaline, the nervures and stigma blackish; there is no areolet; the transverse cubital nervure is short and thick; from it the cubitus slopes down obliquely. Femoral spine short, thick. ♀. Length 6 mm.

Smooth, shining, the posterior median area strongly, closely, transversely striated; the areola obliquely narrowed to a sharp point at the base, gradually narrowed towards the apex, where the keels are clearly separated; there are three basal areæ, the central small, triangular, the lateral large, longer than wide, six-angled, half the width at the base as it is at the apex, where it is longer on the outer than on the innerside; there are two lateral areæ; the basal (four shorter) at the apex extends below the middle. The basal two abdominal segments are cylindrical, the apical are strongly compressed.

Belize (I. D. Johnson).

FIG. 2.—*Hirmoneura brevirostris*, after Macquart.

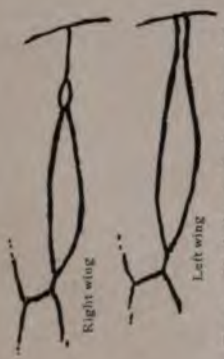


FIG. 1.—Variation in the branches of the media on the two sides of a ♂ *Rhynchocephalus sackeni*.

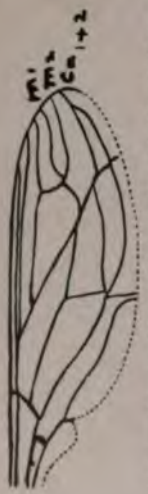


FIG. 3.—*Rhynchocephalus sackeni*, from Williston's figure.

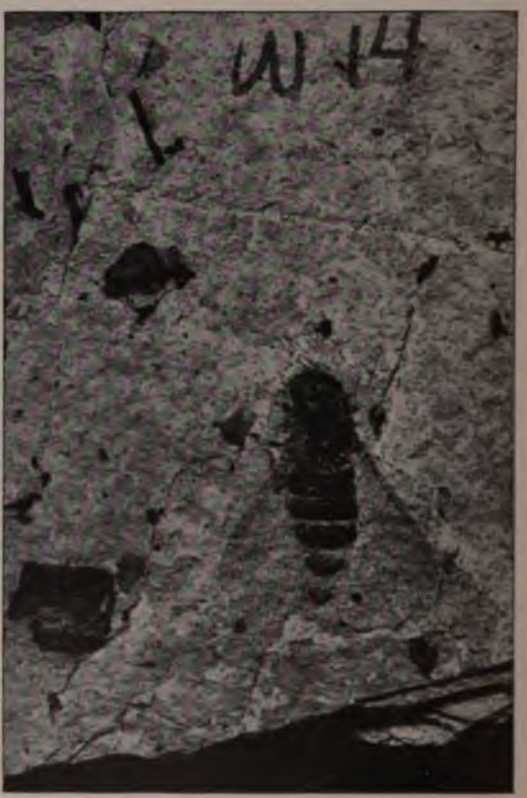


FIG. 4.—*Hirmoneura melanderi*, photograph of the type.

THE DIPTEROUS FAMILY NEMESTRINIDÆ.

BY T. D. A. COCKERELL.

(Plate XVI).

My attention was first called to the Nemestrinidæ by the discovery of a beautifully preserved specimen (*Hirmoneura melanderi*, fig. 4) in the miocene shales of Florissant, Colorado. A second fossil species of the same genus was found among some Florissant material collected long ago, and now in the Museum of Yale University. Professor A. L. Melander, with great generosity, loaned me all his material of this family, representing three species of *Nemestrina* from Turkestan, two of *Rhynchocephalus*, and a beautiful *Hirmoneura* from Texas. The last was recognized by him as new, and it is with his kind permission that I describe it. Professor A. P. Morse very kindly sent me particulars about Scudder's type of *Palembolus;* and to Dr. L. O. Howard and his associates I am indebted for copies of several descriptions, the loan of specimens of *Rhynchocephalus* and the excellent reproductions of the figures of *R. sackeni* and *Hirmoneura brevirostris* (figs. 2 and 3). The photograph of the type of *H. melanderi* was made at the American Museum of Natural History, and is here published with the kind permission of Dr. Bumpus.

The Nemestrinidæ constitute a very ancient family of brachycerous Diptera, a species (*Prohirmoneura jurassica* Handlirsch) having been discovered in the jurassic rocks of Bavaria. Today, they are much reduced in numbers, and in North America are so rare that there are many Dipterologists who have never taken a specimen. They were probably more numerous in miocene times, since three have been described from Florissant—a number altogether exceeding what might be expected in any similar deposit made in America at the present time.

In their venation they are singularly variable (see fig. 1, showing variation in *R. sackeni*), characters which would be of generic value in some other families, proving inconstant here within specific limits. Dr. Williston, in a recent conversation, remarked to me that in his experience it seemed that waning types often showed such variability; whether the morphological break-up is the result or the cause of the failure to persist is an open question.

The venation has been considered very aberrant, but in a former paper (Am. Jn. Sci., April, 1908) I have regarded it as primitive, and have seen in the nervures which bound the second posterior cell the true branches of the cubitus. This view differs from that of Comstock and Needham, and, if sustained, requires a partial modification of their nomenclature. In the accompanying figures I have indicated the veins as I understand them. The following synopsis includes all the known North American species, recent and fossil.

Synopsis of North American Nemestrinidæ.

A.—Proboscis long, projecting anteriorly; subf. *Nemestrininæ* (Miocene in N. America; living in Asia).

PALEMBOLUS Scudder.

Palembolus Scudder, Bull. U. S. Geol. and Geog. Surv. Terr., iv (1878), p. 526.
Palembolus Scudder, in Zittel. Hanbd., i (ii), p. 808 (1885), fig. 1076; Eastman's Edition, i, p. 688, fig. 1467.
Palombolus [err. typ.] Handlirsch, Foss. Insekten, vii (1907), p. 1009.

Related to *Nemestrina* (species from Turkestan compared), but without any cross nervure from the radial sector to the base of the fork of the media.

Palembolus florigerus Scudder, l. c.

Miocene shales, Florissant, Colorado. Type in Museum of Comparative Zoology, Harvard University.

I am greatly indebted to Mr. A. P. Morse for examining, at my request, Scudder's type of *Palembolus*. He compared it carefully with the figure given in Zittel's work, and found it in the main as there represented, but differing in slight details. "The wings are narrower proportionately than represented. The *distal* half of wing on *right* side of figure is more nearly correct, and the *basal* half of wing on *left* side." *There was no evidence whatever of any third radio-medial cross-nervure;* in lacking this nervure the genus agrees with the Jurassic *Prohirmoneura* on the one hand, and the living *Trichophthalma albibasis* (as figured by Handlirsch) on the other. There was some indication of "seam-veins" in the right wing (but not in the left), especially one forming a broadly triangular pseudocell, with its apex at the point of branching of the media. Mr. Henshaw also examined this structure, and agreed with Mr. Morse that it was not a genuine vein; indeed, from its position, it could hardly be one. Whether we have here some indication of the retic-

ulation of the apical field found in *Megistorhynchus* I do not know. In general, the venation of *Palembolus* differs very little from that of *Trichophthalma;* so far as the structure of the wing goes, they might very well belong to the same genus.

B.—Proboscis long, directed downwards or backwards; subf. *Rhynchocephalinæ* (Living in N. America, etc.).

RHYNCHOCEPHALUS Fischer, 1806.

(1) **Rhynchocephalus** s. str.

Branches of cubitus meeting before margin of wing = second posterior cell closed (Williston).

Rhynchocephalus sackeni Williston, Tr. Conn. Acad. Sci., iv, p. 243.

As Williston's description is rather inaccessible, it is given herewith:

"Black, with light yellowish hair. Head broader than thorax, brownish-black. Front broad, thinly blackish haired on the vertex; the lower part, the face, cheeks, and posterior orbits, with thick, bushy, yellowish-white hair, becoming nearly white below. Antennæ short, reddish-yellow, base of first joint infuscated, two first joints subquadrate, third circular. Style of three joints, first joint short, yellowish, second joint twice as long, basal half infuscated, third as long as two first, fuscous. Proboscis reaching the hind coxæ, labium black, other parts, with the slender minute palpi, luteous. Dorsum of thorax and scutellum brownish-black, with yellowish hair; pleuræ and pectus with longer, bushy, grayish-white hair. Abdomen short and broad, black; second segment above, and all the segments upon their sides, with yellowish hair, somewhat intermixed with black at the incisures; third and remaining segments above with sparse hairs and thick yellowish tomentum, wanting upon their anterior borders, giving the abdomen a slightly fasciated appearance. Venter with whitish pile. Lamellæ of the ovipositor slender, black, luteous at extreme base, about as long as intermediate femora. Feet luteous. Femora white tomentose, with tufts of hair on their undersides near the coxæ; anterior and middle pairs, for their basal two-thirds, and posterior, except extreme tips, black. Anterior and middle tarsi infuscated, posterior more so, blackish. Wings hyaline; neuration as in the figure.

"Adventitious oblique vein but slightly arcuated, terminating beyond the middle of the apical half, not continued to posterior border, so that the third and fifth posterior cells are not completely separated; both cross-veins obsolete. Three submarginal cells; first and second open, slender. First posterior open, second closed, the brief petiole terminating in the end of the costal vein before the tip of the wing, fourth (third of Osten Sacken) closed, as usual; third a little shorter than fifth. Long. corp. 9 mm.; long. al. 9 mm. Olympia, Washington Territory,—H. K. Morrison."

Dr. Williston adds that it closely resembles *R. tauscheri*, differing chiefly in the length of the proboscis and the color of the head.

In Entomological News, v, p. 47, it is recorded that Professor L. Bruner found *R. sackeni* near Colorado Springs, Colorado, and observed it apparently deposity eggs in a stem of *Eriogonum alatum*. I have examined two specimens in the collection of the Colorado Agricultural College, collected at Fort Collins, Colorado, June 12th; also one from Clark County, Kansas, June, collected by Dr. Snow.

Rhynchocephalus subnitens n. sp.

♀.—Smaller than *R. sackeni* Will.; length of wing just over 8 mm. (over 9½ in *sackeni*); pubescence paler, with a sort of greenish-grey tint; abdomen less hairy, the bases of segments 2–4 broadly exposed, shining black; ovipositor shorter, with a stronger, more even curvature; eyes apparently lighter and redder; ultimate branches of cubitus (bounding second posterior cell of Williston) uniting only a very short distance before margin of wing (a considerable distance in *sackeni*).

Hab.—Clark Co., Kansas, June, alt. 1960 feet (*Snow*). In the collection of Prof. A. L. Melander. A female of *R. sackeni* Will. also comes from Clark Co., bearing exactly the same data as the type of *R. subnitens*. Two males of *R. sackeni*, agreeing in appearance with the Clark Co. female, are also before me, loaned by the U. S. National Museum. They are labelled Colorado, 8–9000, the latter doubtless referring to the altitude in feet. The collector is not indicated.

In certain respects, the venation of *Rhynchocephalus* is quite variable. Thus:

Third submarginal cell (Williston), i. e. cell bounded by M_1 and M_2.

(*a*) Open at apex, often quite broadly. *R. subnitens*; *R. sackeni*.

(*b*) Closed far below margin of wing, with a small cell at its apex, and the single nervure beyond about as long as that at end of second posterior cell. Right side of one ♂ *R. sackeni*.

(*c*) Sessile at base (i. e. as Williston figures for *R. volaticus*). *R. subnitens*; *R. sackeni*.

(*d*) Sessile and narrowly truncate at base. *R. sackeni*, one ♂.

(*e*) Short-stalked at base. *R. sackeni*, one ♂.

Second posterior cell (Williston), i. e. cell bounded by Cu_1 and Cu_2, according to my interpretation. Sometimes the lower side is a little lower than that of the cell basad of it (fourth posterior), but usually these practically coincide. The difference in the position of the apex of the cell appears to be a specific character, so far as the material shows.

(2) Group (subg. ?) of *R. volaticus*.

Branches of cubitus not meeting = second posterior cell open (Williston).

Rhynchocephalus volaticus Williston, Can. Ent., xv, p. 71.

Florida. ♀.—Length 12 mm., wings 11 mm.; black, with light yellowish pile; abdomen distinctly fasciate; third joint of antennæ

obtusely oval; third joint of style three times as long as the first two together; proboscis reaching about to hind coxæ; lamellæ of ovipositor slender, black, about as long as middle femora.

C.—Proboscis short; subf. *Hirmoneurinæ* (Miocene and Living).

HIRMONEURA Meigen, 1820 (Type *H. obscura* (W.) Meig.).

The following table separates the North American species:

Terminal branches of both media and cubitus uniting before reaching the margin of the wing, forming closed cells (subg. *Parasymmictus* Bigot). **H. clausa** O. S.

Branches of media meeting, enclosing a cell, but those of cubitus parallel, not even approaching; eyes pubescent ..... **H. brevirostris** Macq.

Branches of media and cubitus not meeting apically ..... 1.

1. Miocene species ..... 2.
   Living species ..... 3.
2. Stem of cubitus nearly in a straight line with its lower branch. **H. vulcanica** Ckll.
   Stem of cubitus not nearly in a straight line with either branch. **H. melanderi** Ckll.
3. Eyes hairy, with quite long black pile ..... **H. texana** Ckll.
   Eyes bare, or at most with very few minute hairs ..... 4.
4. Brown, with pale rufous legs; palpi rufous ..... **H. psilotes** O. S.
   Black, with yellowish legs; palpi yellow ..... **H. flavipes** Williston.

The genus appears to contain discordant elements, which might form the basis of two or three genera or subgenera, but upon closer analysis such divisions seem of doubtful value. The venational character of the closed cells in the branches of the media and cubitus is important, but not so stable in this family as in others. In a specimen of *Rhynchocephalus sackeni* the branches of the media fuse on one side, and remain open on the other.

The hairiness of the eyes seems equally important; but it is not an absolute character, as Williston notes that the female *H. flavipes* shows a few scattering hairs, visible with a lens, and suggests that the male may prove to have the eyes distinctly pubescent. It is noteworthy that *H. brevirostris* and *H. texana*, known only in the male, have hairy eyes; while *H. clausa*, *H. psilotes* and *H. flavipes*, known only in the female, have them bare. *H. obscura*, the type of the genus, has them bare.

Hirmoneura clausa Osten Sacken, Western Diptera (1877), p. 225.

Dallas, Texas (*Boll*). Figured in Comstock's Manual, p. 460, as *Rhynchocephalus*.

Hirmoneura brevirostris Macquart, Dipt. Exot., Suppl. 1, 101.

The description is as follows; the species has not been found in recent years.

"*Fusca albo-tomentoso. Proboscide breve. Pedibus rufis. Alis hyalinis.* (Tab. 20, fig. 1.)

"Long. 4½. 1. ♂. Corps assez étroit. Trompe très courte, à peine saillante. Face noire, à duvet gris. Front linéaire. Antennes brunes; les deux premiers articles très velus; troisième brièvement conique. Yeux velus. Thorax et abdomen d'un brun mat, à poils blancs: ce dernier de six segmens distincts. Pieds d'un fauve clair, à duvet et poils blancs. Ailes: trois cellules sous-marginales, dont les première et troisième sont fermées; cinq postérieures, dont la quatriéme est fermée.

De Mérida de Yucatan. Trouvé par M. Pilate."

Hirmoneura flavipes Williston, Trans. Amer. Ent. Soc., xiii, p. 292.

♂. "Black, thickly pollinose; antennæ and legs yellowish; wings nearly hyaline, narrowly luteous in front;....length, with ovipositor 15 mm., without, 13 mm....front narrow, only a little wider below, a little shining, with greyish pollen and black pile....antennæ situated below the middle of the head in profile, short, joints of nearly equal length, the third cordate; pile of basal joints yellow and blackish....face with sparse yellowish pile, but that of the palpi longer, blackish....thorax black, but mostly concealed beneath uniform, thick greyish brownish dust; pile erect, moderately abundant, not long, lutescent yellowish....abdomen like the dorsum of the thorax; at the base, with yellowish pile, beyond with short, reclining, sparse black hairs; a narrow band at the base of second segment, gray pollinose, beyond it a broader brown band; ovipositor directed backwards, composed of five segments, their entire length about equal to that of the two preceding segments together, forming a tapering continuation of the abdomen, the last one elongate, reddish, and split nearly to its base; legs light yellow, the tips of the four anterior tarsi, the tip of hind femora and the rest of hind legs reddish." (Williston.)

A species of the United States, but no particular locality is given.

Hirmoneura psilotes Osten Sacken, Biol. Cent.-Amer., Dipt., i, p. 74.

As the description is not available in many places, it is copied in full.

"♂. Brown, with a brownish-yellow pollen; legs pale rufous; antennæ and palpi rufous; wings tinged with pale brownish, brownish-yellow along the costa; eyes glabrous.

Length, without the ovipositor, about 13 millim.

Hab.—Mexico (Sumichrast).

Proboscis rufous, short, the large lips but little projecting outside of the oral opening; last joint of the palpi long, cylindrical, pale, rufous, closely applied to the facial orbit of the eye and almost reaching the antennæ; antennæ rufous, beset with rufous hair; face and front densely covered with a yellowish-gray pollen; the face beset with pale rufous hairs, the front with black hairs mixed with rufous ones, the latter especially visible in front of the ocelli; front nearly parallel, the vertex very little narrower; eyes glabrous. The brown ground-

color of the thoracic dorsum is modified by a brownish-yellow pollen and yellowish hairs, which cover its surface; the hairs longer on its sides; pleuræ and sternum more grey, with paler yellow hairs; post-alter callosities reddish; scutellum brown. The abdomen, like the thorax, derives its colouring from a brownish pollen which is darker on the posterior half of segments 2, 3, 4 (these segments thus showing slight traces of darker cross-bands); the base with longer pale yellowish-rufous hairs; the posterior half of segment 2, as well as the two following segments, beset with short, semierect black hairs; the three following segments (5-7) are shorter and narrower and end in an ovipositor, which, so far as I can see, consists of a short tube, longitudinally split in two. Legs pale rufous; hind femora slightly brownish at the tip; hind tarsi brown. Wings with a pale brownish tinge, more yellowish along the costa; veins on the anteroproximal half rufous, on the remainder of the wing dark brown; venation like that of the European *H. obscura*, only the handle of the fork of the third vein is straighter. A single female in Prof. Bellardi's collection."

Hirmoneura texana n. sp.

Hirmoneura B, Cockerell, Amer. Jn. Sci., April, 1908, p. 311. (Description and figures of venation).

♂.—Length about 11½ mm., wings 11; black, marked with red on the abdomen; the abundant hair partly black and partly white; eyes purplish-red, almost entirely covering the head, and covered with quite long black pile; lateral ocelli touching eyes; face and base of antennæ with long black hair, mouth and cheeks with white hair; exposed parts of front, face and occiput black; third antennal joint broad, approximately heart-shaped; style black; thorax rather dull dark brown—between coffee and slate color, densely white-haired on sides and beneath, above with the hair mostly black, but largely white on the disc; wings hyaline, faintly dusky, splendidly iridescent; all the apical cells open; legs ferruginous, blackened apically; pile of femora white, except a little black at end, of tibiæ and tarsi short and black; abdomen brown-black, with the hind margins of the segments ferruginous, very broadly so at the sides; approximately basal half of segments with white hair, and apical with black; at the sides this hair forms conspicuous dense tufts, alternating black and white.

Hab.—New Braunfels, Texas, May 12, 1902, taken by Prof. A. L. Melander on a barbed-wire fence.

Hirmoneura melanderi Ckll., Am. Jn. Sci., April, 1908, p. 311.

Miocene shales of Florissant. Length about 15½ mm., wings 10.

A second specimen (Florissant, Sta. 14, *W. P. Cockerell*) shows the abdomen and wings, but lacks the head and nearly all of the thorax. It agrees with the type, except that the abdomen is very long and tapering, the distance from the base of the wings to the top of the abdomen being about 15 mm. In its general shape, the abdomen is suggestive of some species of *Nemestrina*. The specimen is probably a female.

Hirmoneura vulcanica Ckll., Am. Jn. Sci., April, 1903, p. 311.

Miocene shales of Florissant. Length about 12 mm., wings 11.

ANOTHER FOSSIL NEMESTRINID FLY.

BY T. D. A. COCKERELL.

Nemestrinidæ must have been comparatively abundant in Colorado in Miocene times. The Florissant shales have already produced three species; it now becomes necessary to add a fourth:

Hirmoneura occultator n. sp.

♀. Length (excluding ovipositor) 14 mm.; head, thorax and abdomen black; abdomen not banded, 8 mm. long and 6 wide, but its excessive breadth partly due to compression; ovipositor a little over 2 mm. long, slender, very strongly curved. its structure evidently as in *Rhynchocephalus;* wings 10½ mm. long, hyaline, faintly dusky, the base and costal region dilute reddish, veins brown; eyes bare, facets about 30 μ across. No proboscis visible; what looks like a stout proboscis, extending about 2 mm. beyond head, is a fragment of some plant.

Venation nearly as in the living *H. texana* Ckll., but with these differences:

(1) The long or middle radio-medial cross-nervure does not reach the base of the first posterior cell, but falls a moderate distance short of it, about as in *H. vulcanica.* (On the other hand, the base of the third submarginal cell, between the forks of the media, is pointed as in *Rhynchocephalus volaticus*, not truncate as in *H. vulcanica.*)

(2) The base of the fourth posterior cell is more obtuse, but it and the adjacent nervures are otherwise similar. The narrow base of this cell, with three nervures leaving it (upwards, downwards and inwards) at practically the same point, is as in *H. texana*, but very different from *H. vulcanica* and especially *H. melanderi.*

(3) The second posterior cell is shifted downwards, so that its base is only half contiguous with the apex of the fourth.

The cells between the branches of the media and cubitus are somewhat narrowed apically, but open.

The abdomen, as usual, is hairy.

Hab.—Miocene shales of Florissant, Station 14 (*S. A. Rohwer*).

NEUROPTEROID INSECTS—Notes and Descriptions.

BY NATHAN BANKS.

(Plates XVII-XIX.)

To the following descriptions of new species I have added notes on some other forms, especially in the families Perlidæ and Limnephilidæ, groups which I hope soon to revise. I have also figured the genitalia of most of our species of the *Goniotaulius* section of *Limnephilus*. The genus *Diplectrona* has not hitherto been recorded from our country.

PERLIDÆ.

Perla concolor n. sp.—Head bright yellowish; a black spot each side starting in front of each posterior ocellus, and extending forward and outward in front of each lateral scar; antennæ pale yellowish-brown, black on the basal joint; pronotum pale brown, a narrow yellowish median stripe; thorax yellowish-brown, darkest near tip; sternum, venter and legs pale yellowish, tips of femora and bases and tips of tibiæ dark. Wings pale brownish; venation yellowish-brown, rather paler on costal space. Head not much broader than the pronotum; posterior ocelli closer to each other than to the anterior ocellus, and still farther from the eyes; pronotum one and one-half times broader than long, narrowed a little behind, sides straight, and angles quite sharp; the wings rather narrow, the radial sector forked three times beyond the anastomosis, the first just beyond, about seven cross-veins in median and in cubital series. The last ventral segment of the male shows below a median area, more than twice as long as broad. Expanse 38 mm.

From San José, California.

Perla modesta n. sp.—Head yellow, broadly black each side behind eyes, a transverse black band across anterior ocellus and toward antennæ, sometimes with projections upward to the posterior ocelli; palpi pale, antennæ brown, basal joint black; pronotum black, with a broad median yellow stripe, broadest behind, thorax brown, a yellow spot on middle of front; abdomen rather paler brown; setæ brownish, paler at base; legs yellowish-brown, femora darkest and tarsi pale. Ocellar triangle, broader than long, hind ocelli as close to eyes as to each other; pronotum one and one-half times broader than long, barely broader in front than behind, anterior angles acute, hind angles less so; abdomen quite long; setæ short, basal joints very short, apical ones very slender. Wings gray hyaline, venation mostly brown, costal basal part yellowish; radial sector usually forked three times beyond anastomosis, sometimes one of the branches is superior, five or six cross-veins in median series; seven or eight in cubital series; the branches of anal vein approximate at base. Expanse 28 mm.

Several from Boulder, Colo. (August), Rohwer.

Perla illustris n. sp.—Head dull black, with a large pale yellow spot each side behind, above eyes and reaching medially to the posterior ocelli, basal joint of antennæ black above and beneath, second joint wholly pale, rest blackish; pronotum uniform dull black, thorax mostly black, one or two pale spots on each side of the mesothorax; sternum black; coxæ yellow; legs pale, femora lined with blackish; abdomen brownish-black, the segments above margined with pale behind; setæ wholly black. Wings pale, rather yellowish, with mostly yellowish venation, the subcosta and the radius brown on basal half, the radial sector also partly brown. The male is similar to the female, but the venter is yellowish and with three rows of black spots; abdomen above pale yellow on basal part, beyond more reddish-yellow, setæ wholly black. In female the ventral plate is strongly produced in middle, more so than in allied forms (*P. tristis*, *P. flavescens*, *P. capitata*, etc.). In the male the superior appendages are recurved as in allied forms, but the fifth segment is not as much prolonged and has a broader tip than allies. Expanse, ♀, 36 mm.; ♂, 28 mm.

From Mont St. Hilaire, and Montreal, Canada, July.

Differs from allies of this section (*Marthamea* Klap.) of *Perla* in genitalia; from *P. capitata* and *P. media* in dark setæ, and from others in paler wings.

Perla excavata n. sp.—Head yellow, a transverse brown mark over posterior ocelli, extending forward and dividing behind the anterior ocellus, each branch extending outward to a stripe at base of antennæ; clypeus black in middle, basal joint of antennæ black, rest yellowish; pronotum brown, rugulose, plainly broader than long, sides parallel, barely tapering behind, thorax brown; abdomen yellow-brown, paler beneath, setæ yellow at base, beyond brown; legs yellow-brown, tips of femora and tibiæ blackish, the tarsi also dark. Wings gray-hyaline, venation brown, radial sector forked three times beyond the anastomosis. Length to tip of wing 30 mm.

Chain Bridge, Virginia, June 9th.

The species allied to *P. excavata* are the following:

Perla fumosa Banks.

From Virginia and North Carolina; a square black spot over ocelli; wings brownish; ventral structure similar to *P. couloni*, but a very much smaller species, and with wings much darker than any of this group.

Perla lurida Hagen.

I do not have this species; from a sketch made from the type, the ventral plate is similar to *P. couloni*, but from the description it is probably distinct.

Perla couloni Pictet.

Our largest species; I have it from New York and Michigan. The spot over ocelli is rather broad in front and concave, not extending toward antennæ; wings grayish, venation brown.

Perla lycorias Newman.

Specimens from New York and Canada. The spot over ocelli is forked behind front ocellus, and connected to spot at base of antennæ; the pronotum is more or less yellowish.

Perla immarginata Say.

Various places in Ohio, also Michigan. No spot over ocelli; rather smaller than *P. lycorias*, especially the males; the wings have a faint yellowish-brown tinge.

Perla carolinensis Banks.

Only seen from North Carolina; black spot over ocelli extends forward so that it is very large; wings brownish, venation blackish; nearly as large as *P. couloni*. All specimens seen have a cross-vein from near tip of upper branch of radial sector to the radius or near tip of radius.

Perla xanthenes Newman.

Specimens from Virginia and North Carolina. Wholly greenish yellow or yellowish, no spot over ocelli, venation pale.

Perla valida Banks.

Only from North Carolina; looks much like *P. immarginata*, no mark over ocelli.

PSOCIDÆ.

Psocus persimilis n. sp.—Head yellowish, nasus finely lineate with black; eyes prominent; their tops higher than vertex; antennæ brown, slender; densely short haired, first joint plainly a little longer than distance between eyes; thorax and abdomen brownish; legs pale yellowish. Wings hyaline; venation mostly brown, a faint pale spot at fork of radial sector, and at outer tip of the discal cell; stigma brown on apical half, the color extending somewhat below, a black dot at base of stigma, and also one at end of anal vein; discal cell slightly five-sided, about one and one-third broader at base than at tip, neither side concave; the third posterior cell is shorter on base than the others, which are subequal; stigma long, evenly rounded behind. Length 4 mm.

Brownsville, Texas (Snow); allied to *P. confraternus*, but smaller, less marked, and with differently shaped discal cell and more rounded stigma.

Psocus cubanus n. sp.—Nasus black, vertex pale; antennæ pale on basal part, darker beyond; thorax dull black, hind margin of mesothorax and metathorax narrowly pale; legs pale yellowish. Wings hyaline, whitish on basal part; a black band across wing from end of anal vein, but not reaching the costa; a black spot at base of pterostigma, a larger black spot in apical part of

pterostigma, and one behind the pterostigma just before the angle; venation mostly black, the pterostigmatal vein yellowish, the apical corners of the cell, and the base of the branch of radial sector are snow-white; the basal part of radius and medius are also pale. The pterostigma is long, the outer side very oblique, and the angle not very sharp, yet not rounded; the cell is five-sided, extending a very short distance on radial sector, it is plainly broader at base than at tip, about one and one-half times as long as broad, and the outer side not concave; the posterior cells are all equally wide at base. Length 3 mm.

Havana, Cuba (Baker). Near *P. floridanus*, but the pterostigma is not as broad, not as angulate behind, the outer side more oblique; and the markings also different.

Myopsocus maculosus n. sp.—Head yellowish, a median brown stripe from ocelli over vertex; nasus lineate with brown; antennæ pale, densely hairy, first long joint plainly longer than width of head; thorax pale brown, a pair of dark brown spots close together on top of the mesonotum; abdomen brown; legs pale yellowish, darker at tips of the femora and tibiæ. Wings hyaline, with many scattered small brown spots, and some larger ones; at base of the pterostigma, at forking of median, at end of anal vein, three in a transverse row; also in apex of stigma, and in third posterior cell; but the general appearance of the wings is much paler than in the other species of the genus. Discal cell nearly twice as long as broad, only a little broader at base than at tip, the outer side strongly concave, stigma large, angulate below. Length 5 mm.

Berkeley, California, June.

Cæcilius clarus n. sp.—Pale yellowish, antennæ slightly brown; wings hyaline, venation pale, a dark dot at base of stigma, the base of radial sector, the cubitus as it leaves the median, and also with brown cloud just before its tip, and also at tip of anal vein, and smaller clouds at ends of branches of median that form the posterior cells, in one specimen these marks are very indistinct. The wings are rather short, the stigma is long, about as long as the width of wing at middle of length, and of even width throughout, the pedicel of the fork of radial sector is about as long as width of a cell, the third posterior cell is small, about twice as long as high. Length 3 mm.

Berkeley, California, on bay laurel.

Polypsocus fasciatus n. sp.—Head dull brownish-yellow, nasus blackish above; antennæ pale yellowish, slightly darker at tips of the joints, very hairy; thorax dull brownish-yellow, rather blackish on the lateral lobes, legs pale yellowish. Wings whitish hyaline, suffused and marked with pale brown; a band along apical margin to angle, where it joins a pterostigmal band, broader in front, the pterostigma not more prominent; along the anal vein is a black streak, a narrow, distinct white interruption, and then a black spot; a costal spot of brown before the stigma, and in the middle of the wing behind the latter spot are several brown patches adjoining white-margined veins. The venation is on the plan of the genus; the anal cell even longer than the pterostigma, and just before the origin of the radial sector are one or two short veins invading the cell from beneath and usually forming one or two small cells. Length 3.2 mm.

From Cayamas, Cuba (Baker).

EPHEMERIDÆ.

Potamanthus medius n. sp.—Pale yellowish, a broad median reddish stripe on prothorax and vertex of head, and less distinctly on mesothorax; the part on head is broader than elsewhere, and on the face it is broadened to reach the eyes, or nearly so; tips of femur and tibia 1 are slightly infuscated; setæ narrowly annulate with brown at the tips of the joints, the median seta rather smaller than the others; eyes of female scarcely if any more than two diameters apart, hind margin of pronotum emarginate on middle. Expanse 22–24 mm.

Douglas Co., Kansas, at electric light, July.

Resembles *P. myops*, but is smaller, and the eyes much closer together.

CHRYSOPIDÆ.

Chrysopa placita n. sp.—Head greenish, a narrow black crescent under each antennæ, a black mark below each on clypeus, and one under each eye, vertex with a rather broad brown streak each side, close to each eye, faint traces of a pair of submedian rufous streaks; antennæ yellowish, basal joint greenish, second not marked with black; pronotum greenish, yellowish in middle, a small black mark on each anterior side, and an indistinct rufous patch each side on disc; thorax green, abdomen greenish, discolored with brown; legs pale greenish. Wings hyaline, with green venation, marked with black, the cross-veinlets mostly black, the anal veins and its branches black, the upper side of the second cubital cell and the divisory veinlet of third (mostly at least) black; also the base of the radial sector; hind wings with venation mostly green; the stigmal region brownish in all wings. Forewings rather long and narrow, not very acute at tips, the third cubital cell is long, and the divisory veinlet ends much beyond the cross-vein; five veinlets in the inner gradate series, six or seven in outer. Expanse 25 mm.

Specimens from Clear Creek, and Chimney Gulch, Golden, Colo. (July), (Oslar). The black marks on face and pale second antennal joint are distinctive.

Meleoma verticalis n. sp.—Pale green; a long blackish stripe under each eye toward mouth, mandibles blackish; palpi lined with black; basal joint of antennæ below near tip is reddish, and the second joint has a blackish mark beneath, vertex with a pair of short parallel reddish stripes; the horn is shorter and wider than in *M. innovata*, the basal joint of antennæ much swollen beneath at tip, the third elongate, and very distinctly swollen on inner side. Thorax green, with a pale yellow median stripe; abdomen green. Wings greenish hyaline; venation green, many cross-veins black, all of the branches of the anal and several basal costal veinlets wholly black, many others in part black, but the gradate series green. Expanse 35–38 mm.

Specimens from Chimney Gulch, Golden, August 3rd (Oslar); Green Mt. Falls, July (Tucker); Cheyenne Canon, Colorado Springs, July (Tucker), and Arboles, all Colorado; also White

Mountains, Rio Ruidoso, 6,500 ft., July 30th; Santa Fé, July, and Magdalena, all New Mexico; a female from Vancouver Island, British Columbia.

Differs from *M. innovata* in marks on vertex, and more black cross-veins, in shape of the horn, and especially in the long and swollen third antennal joint. Some of these specimens were formerly referred to *M. innovata*, but with more material they appear distinct, and I do not know that *M. innovata* occurs north of Mexico.

Meleoma pallida n. sp.—Head pale yellowish (green in life ?), no marks under eyes, palpi pale, unmarked; antennæ very wide apart at base; the horn short and broad, divided by a furrow in the middle, slightly concave in front; basal joint of antennæ very long, swollen near tip, third not elongate nor swollen; vertex and thorax unmarked. Wings hyaline, venation green, many cross-veins black in part, the gradate series brown, but the branches of anal are mostly pale; stigma indistinct in both pairs. Expanse 37 mm.

From Huachuca Mountains, Arizona, August 20, 1905, 8,000 ft., (Oslar).

HEMEROBIIDÆ.

Boriomyia pretiosa n. sp.—Face yellowish-brown; a black mark under each eye, and one between bases of antennæ; vertex with a spot each side near eye, and one in middle; pronotum with brown dots; mesonotum with a basal black band on frontal slope; abdomen dark brown, densely yellowish haired at tip of the male; legs pale yellowish; the coxæ brownish. Wings hyaline, with pale venation, dotted with black; from most of the dark dots small clouds extend out on the membrane, no distinct larger brown spots; stigma indistinct in both pairs. Forewings rather broad, costal region broad near base, three radial sectors, and the first not connected to radius, the third connected to radius once; the last veinlet of the inner gradate series slightly before or at the preceding veinlet; in the hind wings the fork of radial sector is even with the fork of the median vein. The male appendages are similar to those of *B. coloradensis*, but (seen from the side) are much narrower at tip. Expanse 15 mm.

Specimens from Chimney Gulch, Golden, July 22nd, and Clear Creek, both Colorado (Oslar).

Hemerobius placidus n. sp.—Head yellowish, cheeks darker, antennæ yellowish, palpi pale, last joint brown; thorax brown on sides, pale in middle; abdomen brown; legs yellowish. Wings pale brownish, venation darker brown, interrupted with pale, a large dark brown spot over veinlet connecting median and cubital, another smaller dark spot at the first cross-vein beyond, indistinct clouds over each gradate series, margin with black dot at and between ends of each vein; hind wings pale, stigmal region barely darker. Forewings rather long; the median bent toward the cubitus at connecting veinlet, but not as much as in *H. humuli*, three radial sectors; in the inner gradate series the hind cross-

veinlet is barely if any beyond the preceding veinlet, the costal space is only moderately broad at base; in the hind wings the fork of the radial sector is plainly before fork of median vein. Expanse 20 mm.

Specimens from Lake Placid, New York, August 12th; Peru, Mass., August 26th, and Mt. Katahdin, Maine.

By position of posterior veinlet of inner gradate series, and moderate costal area it is allied to *H. stigmaterus*, but the shape of appendages, especially the lower part, separates it from that species.

Hemerobius alpestris n. sp.—Face yellowish, with a transverse blackish band below antennæ, extending down each side to the clypeus, cheeks dark; antennæ pale yellowish, the basal joint brown, beneath pale, pronotum brownish; thorax yellowish-brown; abdomen nearly black, with long golden hair near tip above; legs pale yellowish. Wings faintly brownish, venation brown, interrupted with white, no large brown spots on wings, but the posterior and outer margins are broadly brown, more distinctly brown than rest of surface, indistinct clouds over each gradate veinlet; hind wings pale, stigma rather yellowish. Forewings rather short and broad, costal area moderate, last veinlet of inner gradate series slightly beyond preceding, the median is not bent toward the cubitus at the connecting veinlet, which is nearly as long as veinlet to anal; three radial sectors; in the hind wings the radial sector forks beyond fork of median vein. Expanse 13 mm.

Sugar Loaf Mountain, Colo. (8,500 ft.), May 13th. Mr. Rohwer.

Sisyra apicalis n. sp.—Face yellowish, vertex dark brown, both with golden hair; antennæ yellow-brown on basal joint, jet black beyond for nearly two-thirds of its length, then pale yellowish to near the tip which is black; thorax brown; coxæ brown, rest of legs pale yellowish; abdomen blackish. Wings fumose; veins brown, and a brown streak through each cell. Wings slender; about seven costal cross-veins, all near base, radial sector with three branches and connected back to radius twice, the first three veins beyond end of radius are forked only near margin of wing, the next three are forked near margin and also about one-third the distance across wing. Length 5 mm.

Havana, Cuba (Baker).

Distinct from *S. vicaria* by smaller size, more slender wings, fewer costal cross-veins, by colors of antennæ and minor points.

PANORPIDÆ.

Bittacus texanus n. sp.—Rather reddish-yellow, ocelli on black, hind tarsus brown; wings more rufous-brown than in other species; in color similar to *B. mexicanus*, the costal apex of the wings being darkened as in that species; legs immaculate. Antennæ minutely pubescent; hind femora swollen on basal part as much as in *occidentis*, but the joint is much longer. Male genitalia on the plan of *B. stigmaterus*, but the superior appendages are twice as long as the tenth ventral segment, the tip rounded, hairy, the upper edge barely concave, humped

at base the slender lower appendages (harpes) are longer than the tenth ventral segment, and a little more than one-half as long as the upper appendages.

One specimen from Plano, Texas, July (Tucker).

In size and appearance like *B. mexicanus*, but in that species the lower appendages (harpes) are as long as the superior appendages.

LIMNEPHILIDÆ.

Anabolia assimilis n. sp.—Face pale yellowish, with yellow hair, and a row of black bristles each side near eye; palpi paler; vertex yellowish-brown, ocelli rather large, the discal bristles between ocelli; the posterior warts small and low; basal joint of antennæ brown, beyond yellowish, narrowly annulate with brown; pronotum rather prominent, with many black bristles, and long yellow hairs; thorax brown, with a broad pale median stripe; abdomen yellowish-brown, appendages pale; legs pale yellowish, with black spines, the spurs 1-2-3, those of leg II and III very long and slender, the subapical on III, about one and one-half its length from tip; beneath femur I is a narrow black line. Wings very much like those of *Anabolina diversa*, of a brownish yellow tinge, with yellow and black hairs, the stigmal region brownish, and all behind cubitus (and sometimes a little in front of it) is mottled with brown, the cubitus and anal veins are very dark, other venation brown, interrupted with pale. Forewings long and slender, apex rounded, discal cell longer than pedicel, first apical about width on discal, fourth as wide as third at base, fifth barely in front of the anastomosis. Expanse 26 mm.

Prescott, Arizona.

Although the spur-formula is like *Ecclisopteryx*, the insect is different in many other characters.

Anabolia nigricula n. sp.—Head black, palpi pale; basal joint of antennæ deep black, rest of antennæ brown, annulate with pale, a pale streak in vertex each side close to eyes; thorax black, with a broad median stripe of white pollen, pronotum rather paler above; abdomen brown, apex black, appendages yellowish. Legs yellowish, spines black, spurs rather short, a black streak beneath at base of femur I. Wings brown or almost black, venation black, interrupted with pale, stigma rather darker, cubitus and anal veins broadly black, an oblique hyaline spot at thyridium and one at arculus, elsewhere there are many very small pale dots, especially on anterior half and on the apical part of wing. Hindwings with the stigma dark. Discal cell of forewings longer than the pedicel, first apical its width on discal, fourth fully as wide as third at base, fifth about one-half its width back of anastomosis. Expanse 29 mm.

Clear Creek, Colorado, September 10th; Florissant, Colorado.

Limnephilus rohweri n. sp.—Face pale, with yellow and black hair; palpi pale; vertex brown, with some yellow hair, a transverse yellow wart each side behind; antennæ yellowish, faintly annulate with brown, basal joint with some black hair; pronotum yellow, with yellow hair; thorax yellow-brown, abdomen darker brown; legs yellow, with black spines. Wings mostly hyaline.

mottled with pale brown, the brown much broken up, costal area wholly pale; a narrow oblique thyridio-discal pale stripe, continued outward across anastomosis and through the fourth and base of fifth apical cells to the outer margin of wing, basally this pale stripe extends below median vein toward the base of wing; the brown each side of the pale stripe is darker and more heavily spotted than elsewhere; the whole somewhat resembling *Platyphylax designata;* hind wings gray hyaline, venation pale. Forewings rather long; discal cell as long as pedicel; first and fifth apical cells not their width before the anastomosis; in hind wings the fourth apical at base is about one-half the width of the third. Expanse 26 mm.

From Florissant, Colorado, June 22nd (Rohwer).

Limnephilus macgillivrayi n. sp.—Head yellow, with yellow and white hairs; antennæ and palpi pale yellowish; thorax yellow, with yellowish hair; abdomen brown, appendages yellowish; legs pale yellow, with black spines, a few yellow ones on front pair. Wings unmarked on anterior third, beyond yellow-brown, with an oblique thyridio-discal spot, another in base of first subapical and up to front of the anastomosis, another in base of apical cells, and one in apical part of the fourth and fifth apicals and the first and second subapical cells, all pale; a few smaller dots in the brown; hindwings hyaline, venation yellowish. In forewings the discal cell is as long as the pedicel, the first apical scarcely its width on discal, the fifth hardly before the anastomosis; in hindwing the second, third and fifth apicals subequal at base, the fourth much narrower. Expanse 25 mm.

From Axton, Adirondack Mountains, New York, June 12-22nd (A. D. MacGillivray).

Very distinct by shape of superior appendages of male.

Limnephilus (Goniotaulius) bifidus n. sp.—Face yellow, with yellowish hair, palpi yellow; vertex brown on middle, rest yellow; antennæ yellow-brown, marked with darker brown; posterior warts long and yellow, bearing yellow bristles; pronotum yellow, with short yellow hair, and longer black bristles; thorax black; abdomen brown; legs all very pale yellowish, spines black. Wings heavily mottled with brown, except on costal area, the bases of apical cells paler, a large thyridio-discal spot, one in apex of subapicals, most of the hyaline spots confluent, in general marked like *G. mœstus.* The superior appendages of the female are two long slender approximate plates, the lower appendages more slender and projecting beyond upper. Expanse 28 mm.

Pullman, Washington State (Piper). A male from Wellington, B. C., May 14, 1897, probably belongs to this species. It has a similar pale face, large discal brown spot on vertex, the tips of tibiæ and tarsal joints blackish; the wings are not fully colored, but from what can be seen they are marked like the female. The male genitalia, as shown in figures, is very characteristic.

Limnephilus (Goniotaulius) abbreviatus n. sp.—Face black, with black and yellow hairs; vertex black, the discal bristles somewhat behind the ocelli; antennæ brown, narrowly annulate with pale, pronotum not promi-

nent; thorax black, with a broad, pale median stripe; abdomen brown, segments bordered behind with pale; legs pale yellow, tibia I dusky near middle, subapical spurs of hind tibiæ fully twice their length from the tip. Wings brown, costal area and most of discal to the anastomosis paler, base of apical cells pale, rest of apical part of wings, the stigma and the posterior part (except anal edge) brown, more or less spotted with pale; not many spots in apical part; a large oblique thyridio-discal spot, and many small ones near the posterior anastomosis and along the anal vein. Discal cell longer than pedicel, first apical about one-half its width on discal, fourth about one-half the width of third at base, fifth not reaching before the anastomosis. Superior appendages of male black, slender, shorter and nearer together than in *G. mœstus*. Expanse 21 mm.

From Tabernash, Colo., August (Tucker).

Limnephilus (Goniotaulius) canadensis n. sp.—Face brown, with yellowish and black hair, vertex brown, with stout black bristles and short yellow hairs, the discal pair between the ocelli, a pair of submedian warts behind, and an oblique one on each side near eye, all bearing long stiff black bristles. Abdomen brown, segments margined with pale behind; legs pale yellowish, with black spines, subapical spurs on hind tibiæ not twice their length from tip. Wings pale, very hairy; costal area unmarked; discal area to the anastomosis brownish, with many small rounded spots, the apex and posterior region more or less brownish, and marked with pale spots, a brownish spot on the stigma. Discal cell scarcely as long as pedicel, first apical not its width on discal cell, fourth apical nearly as wide as third at base, fifth not one-half its width back of anastomosis, the tip of abdomen of the female shows above a long plate, cleft to near its apex. Expanse 21 mm.

One from Laval Co., Canada, June 29th; another from Orono, Maine. The latter is rather more heavily marked, especially near pterostigma and along cubital vein.

Limnephilus (Goniotaulius) occidentalis n. sp.—Head black, clothed with mostly black hairs and bristles, the discal bristles are between the ocelli; antennæ brown, narrowly annulate with pale, basal joint black; pronotum quite prominent, with many stout black bristles, thorax and abdomen dark brown or black; femora black, rest of legs pale, tibia marked in middle, and apex of each tarsal joint black, spines black, on hind tibiæ the subapical spurs are about twice their length from tip. Wings more or less brown, often quite dark, with many small pale spots, the costal area pale, an oblique thyridio-discal spot, arculus hyaline; very few spots beyond the anastomosis, and they are small; stigma rather darker than rest of wing; hind wings grayish hyaline, with dark stigma. In forewings the discal cell is rather longer than the pedicel, the first apical is not its width on discal cell, the fourth is about two-thirds as wide as third at base, the fifth not before anastomosis. The female shows two approximate slender superior appendages, and the male has the last dorsal segment prolonged in the middle. Expanse 20 mm.

Many specimens from Wellington, B. C.; Tacoma, September 5th; Pullman, September 21st, May 14th; Temino, September 25th, and Olympia, all in Washington State.

In some specimens the brown along radius, cubitus and anal vein and beyond anastomosis is much darker than elsewhere.

Platyphylax designata Walker.

There are three forms of this species known to me, which, for the present, I consider but varieties of the one species. These three forms are variable in the development of the median stripe; sometimes interrupted at the anastomosis, sometimes continuous; The form in the Northeastern United States I shall consider as the typical *P. designata;* some, at least, of Walker's specimens (if not all) were of this form. The typical *P. designata* is of moderate size, and often quite dark; the superior appendages of the male (seen from the side) are narrowed above before tip.

The specimens from Colorado and further west are larger, paler, and in the male the superior appendages (seen from the side) are not narrowed before tip. This form I call *P. designata* var. *occidentalis.* I have it from various places in Colorado, New Mexico, Washington and California.

The form from Alaska is about the size of the typical *P. designata*, but very much darker; a uniform brown, with a narrow pale stripe behind radius, and the usual median stripe. In the male the superior appendages (seen from the side) are slightly concave below, and not narrowed before the tip; the lower appendages are more acuminate at tip than in other varieties; it may be called *P. designata* var. *alaskensis.*

LEPTOCERIDÆ.

Leptocerus recurvatus n. sp.—Black, clothed with white hairs; sides of thorax brown; antennæ yellowish-brown, narrowly annulate with black, the subantennal tuft yellow-brown; legs yellowish, the fore pair darker; abdomen blackish near base, pale beyond. Forewings brownish, basal anal area paler, also costal area, venation dark brown, a rather blackish spot over ends of first apical fork, the base of the upper branch of the median brown, the rest hyaline until the anastomosis, the pedicels of forks one and three about equal in length; hind wings more hyaline, the anterior venation brown, rest paler. Expanse 22 mm.

From Westfield, N. Y., June, July (Woglum).

HYDROPSYCHIDÆ.

Hydropsyche pettiti n. sp.—Head brown, face and vertex clothed with yellowish hair; palpi brown; antennæ pale yellow, with brown spiral mark; prothorax with long yellow hairs, and tuft at base of wing; dorsum of thorax

with short yellow pile; abdomen black above, gray below; appendages yellowish. Wings heavily marked with brown, a large pale spot over arculus, and rest of wing guttate with greyish-white, venation brown; hind wings with stigma darker, legs pale yellowish. On middle tibiæ basal spurs are but little more than their length from base, but not twice as far from apex. In hind wings no first apical, the upper branch of radial sector not forked. Male appendages as figured, apical part of lower appendages very slender, upper pair bifid from side-view, above with an inward directed point. Expanse 15 mm.

Agricultural College, Michigan, June 20th.

Arctopsyche apicalis n. sp.—Similar to *A. ladogensis;* wings pale, veins fuscous, and more or less margined with fuscous, mostly in spots, and at apex of the veins are other spots, sometimes more or less connected, and two spots on costa near the stigma. Body black, head and thorax clothed with mostly greyish-white hair, some yellow hair on prothorax, and black on the warts; legs pale yellowish, tips of hind tibiæ faintly blackish; antennæ heavy, yellowish, faintly marked with brown. The first pair of spurs on the middle tibiæ are at about the middle of the length. Discal cell of forewings much longer than in the other species, nearly twice as long as in *A. ladogensis.* Expanse 19–24 mm.

Franconia, New Hampshire (Mrs. A. T. Slosson); Fourth Lake, Fulton Chain, Adirondack Mts., N. York, June 12th (Dickerson).

Much smaller than the other species, and also differs from *A. grandis* in lacking the many pale spots on the wings.

Diplectrona modesta n. sp.—Black; with golden hair on head and thorax, especially on the warts, between the antennæ and at bases of the wings, rest of thorax and the abdomen brownish; legs pale yellowish, the femora rather darker; wings brown, venation brown, surface with very short golden hairs. Maxillary palpi very long; antennæ with each joint prominent below; spurs 2-4-4, those on front pair very short, and the first pair on middle tibiæ are at about the middle of length. On the side of abdomen, between the fourth and fifth segment arises a very slender, stiff filament, which in the male reaches nearly to the tip of the body. Wings moderately long; venation similar to that of *D. felix,* but the discal cell is much longer, and in the hindwings fork 1 is extremely short. Expanse, ♂, 17 mm.; ♀, 19 mm.

Riverside, Mass., June (C. W. Johnson).

PLATE XVII.

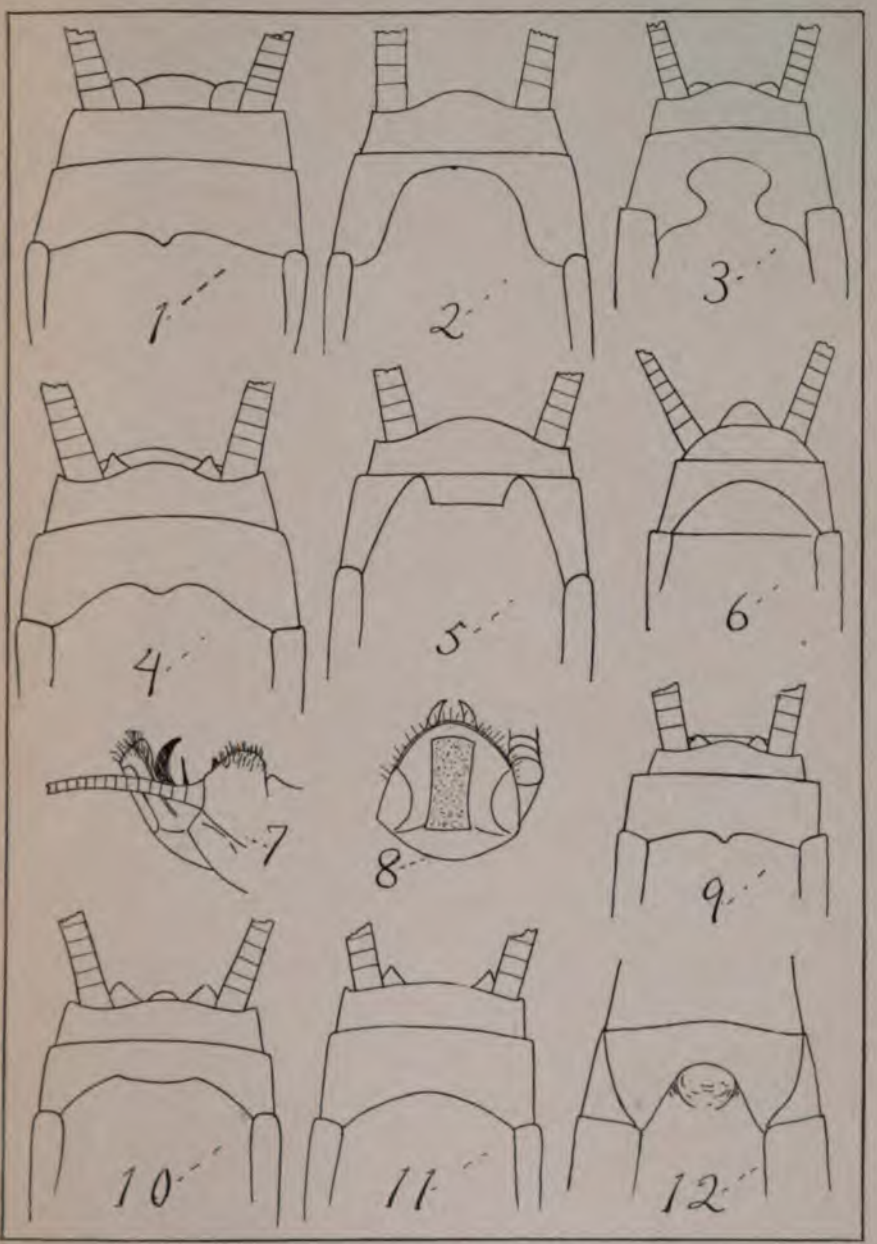
Fig. 1.—*Perla couloni*, ventral plate.
" 2. " *immarginata*, "
" 3. " *valida*, "
" 4. " *carolinensis*, "
" 5. " *xanthenes*, "
" 6. " *modesta*, "
" 7. " *concolor*, male genitalia, side view.
" 8. " " " " end "
" 9. " *fumosa*, ventral plate.
" 10. " *excavata*, "
" 11. " *lycorias*, "
" 11. " *illustris*, "

PLATE XVIII.

Fig. 1.—*Limnephilus occidentalis*, female.
" 2. " *rohweri*, male.
" 3. " *occidentalis*, male.
" 4. " *canadensis*, female.
" 5. " *despectus*, female.
" 6. " *extractus*, male.
" 7. " " female.
" 8. " *abbreviatus*, male.
" 9. " *nebulosus*, male.
" 10. " *macgillivrayi*, male.
" 11. " *bifidus*, male.
" 12. " *submonilifer*, males.
" 13. " *bifidus*, male.
" 14. " " female.
" 15. " " female.
" 16. " *submonilifer*, females.

PLATE XIX.

Fig. 1.—*Boriomyia pretiosa*, male, side.
" 2. " " male, above.
" 3.—*Hemerobius placidus*, male, side.
" 4.—*Meleoma pallida*, horn, male.
" 5. " *verticalis*, horn, male.
" 6. " *innovata*, horn, male.
" 7.—*Hemerobius alpestris*, male, side.
" 8.—*Leptocerus recurvatus*, male.
" 9.—*Anabolia assimilis*, male.
" 10. " " female.
" 11. " *nigricula*, male.
" 12.—*Hydropsyche pettiti*, male.
" 13.—*Diplectrona modesta*, male.
" 14.—*Platyphylax alaskensis*, male, sup. appendage.
" 15. " *designata*, male, sup. appendage.
" 16. " *occidentalis*, male, sup. appendage.



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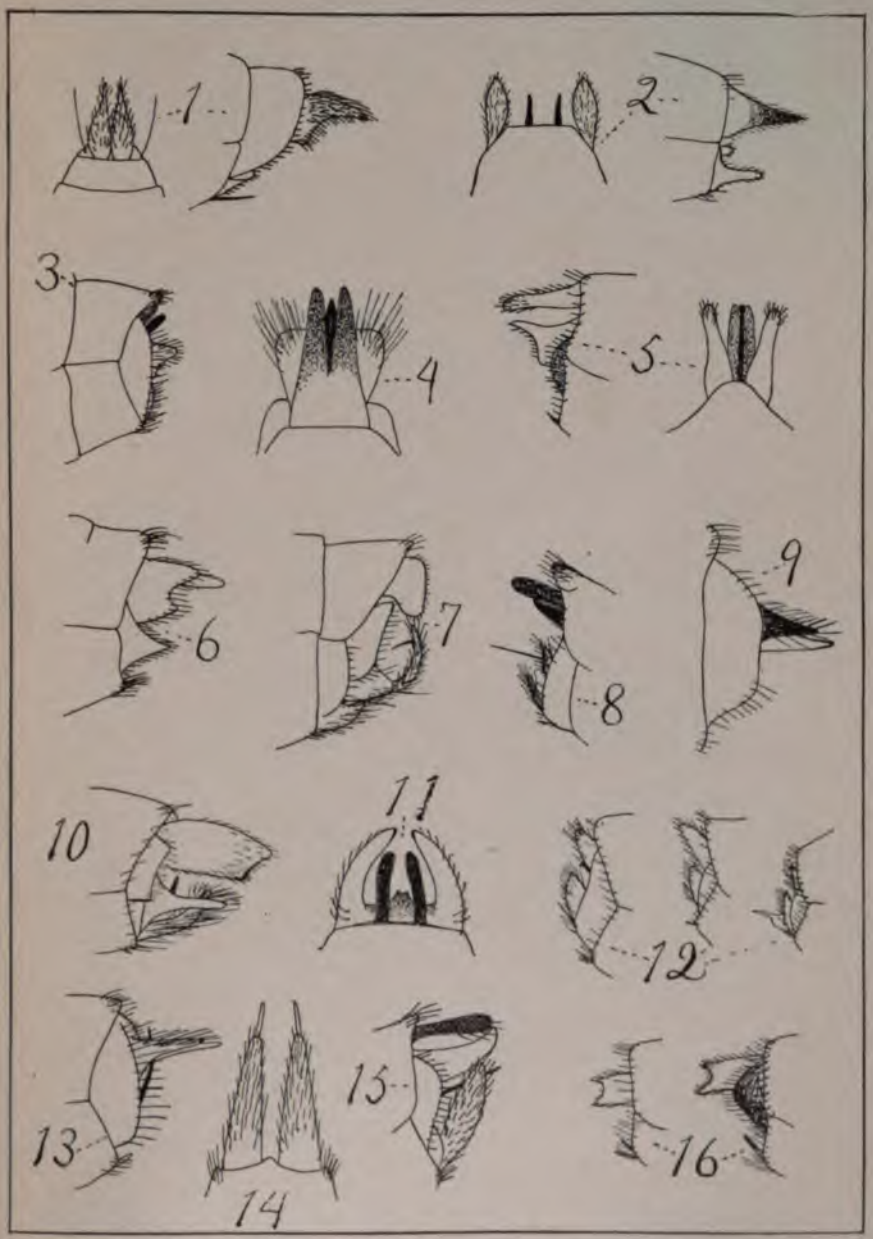

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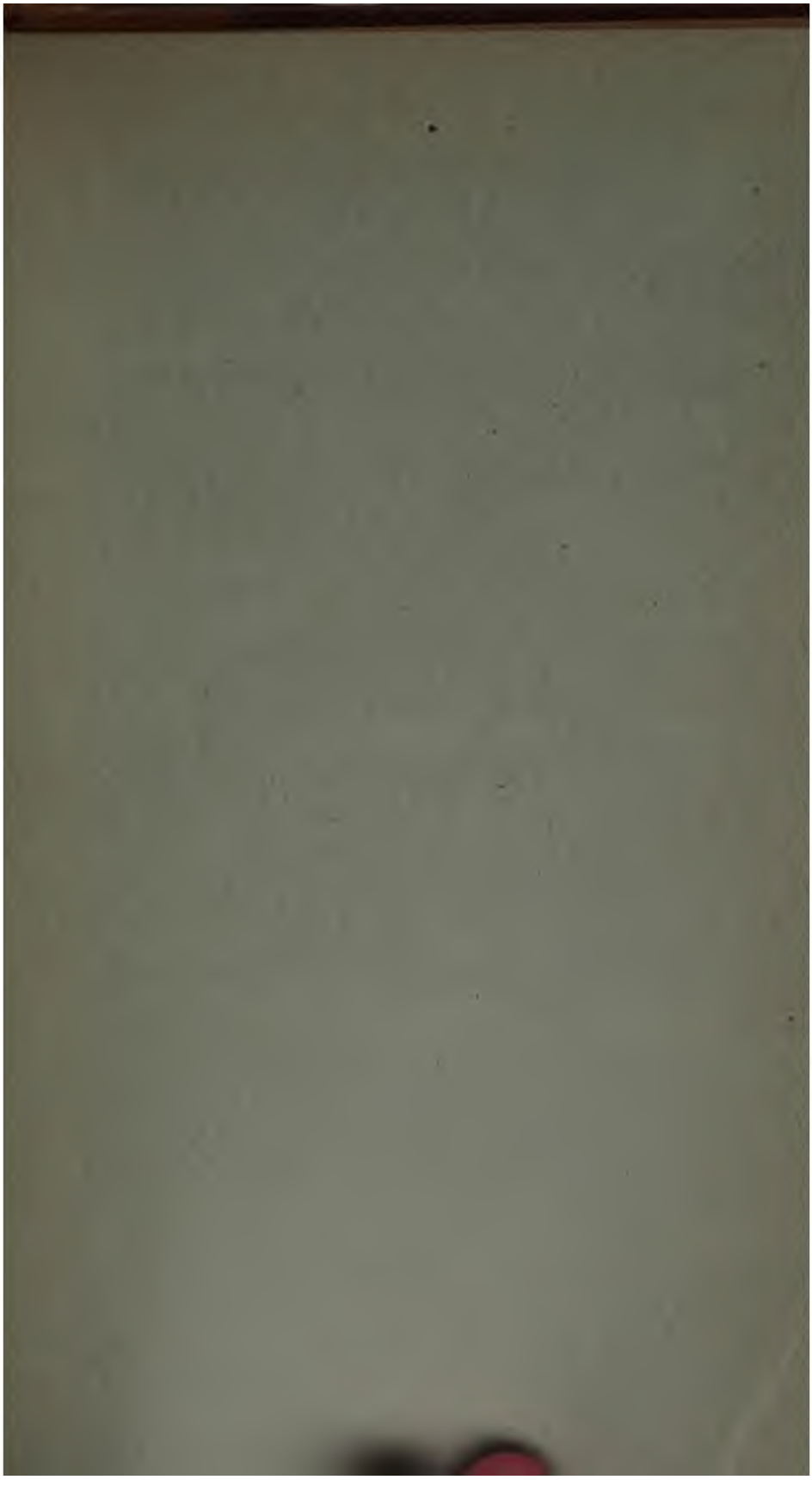

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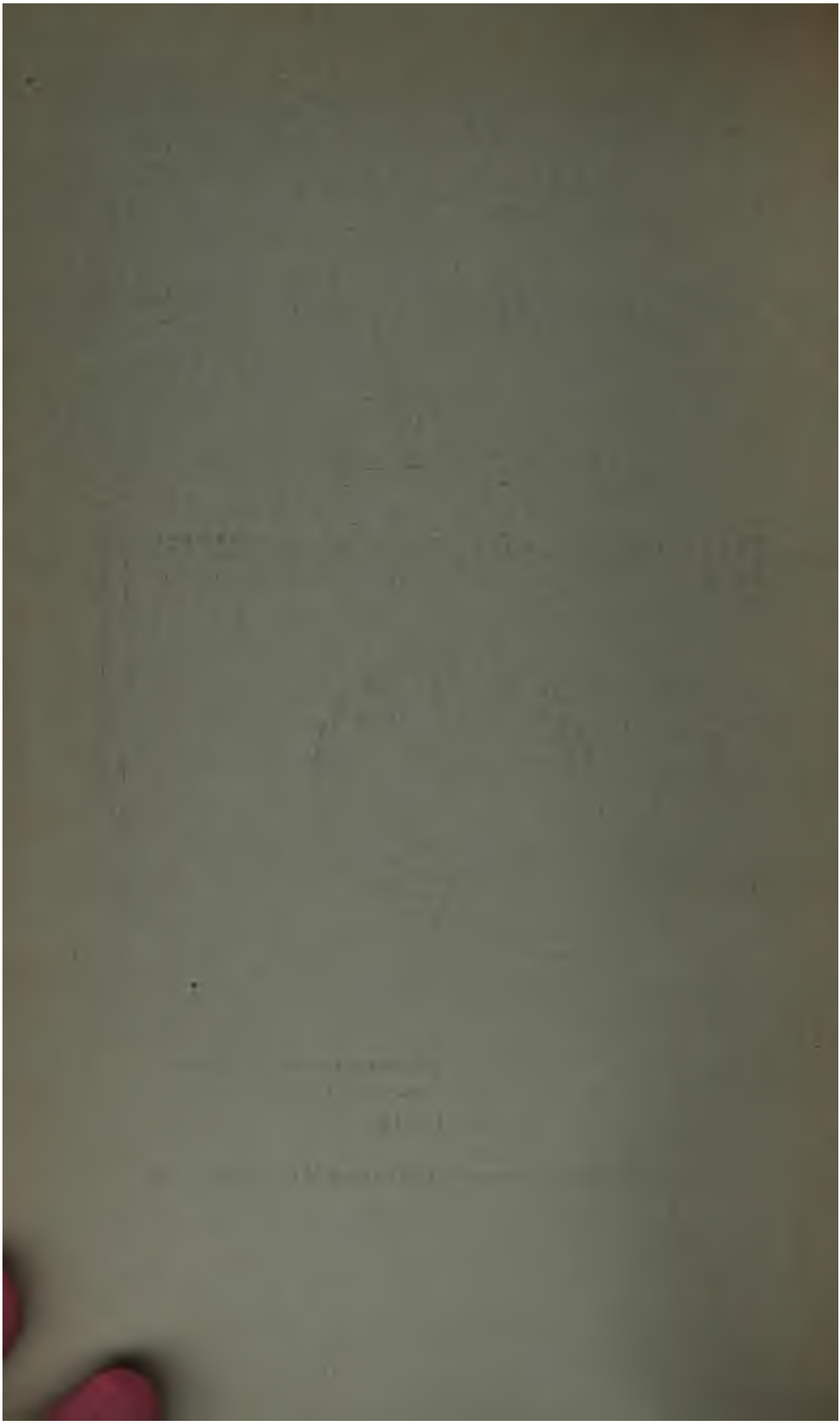


Revision of the North American Species of the Genus LITHOCOLLETIS Hübner.

BY ANNETTE F. BRAUN.

From the Biological Laboratory of the University of Cincinnati.

(Plates XX-XXIV.)

PREFACE.

In the present revision, the American species of the genus *Lithocolletis** are divided into several natural and easily definable groups, based upon structural differences, not sufficient, however, to warrant the establishment of new genera.

Of necessity, this work is far from complete; the West remains practically unexplored, and it is to be expected that a large number of species are still awaiting description. It is hoped that this systematic arrangement, and the collection of scattered descriptions, rendering identification less difficult, will result in increased effort on the part of those having an opportunity for breeding and collecting in little known regions.

It was the original purpose to give illustrations of every species. The plates contain figures of all of which I was able to see specimens. The figures were in all cases sketched by the author from authentic specimens, most of them bred, and often from the types themselves. It will be noticed, however, that the figures of six species are lacking: of one of these, *L. alni* Wlsm. (= *alnivorella* Cham.), I have seen no specimens and no type is in existence; the types of the other five are in the possession of Lord Walsingham, and I regret that my efforts to secure figures of these have been unsuccessful.

In a number of cases, where the original descriptions are accurate and have proved adequate for the identification of the species and varieties, the original is reprinted. Where the species were described in German, translations following as closely as possible the original text are often given. In these cases, I have added my notes collected by breeding and by the examination of additional specimens. Where the original description might have proved misleading through peculiarities of the specimen described or through the omission of certain characteristics, new descriptions are printed. The necessity of constant reference to detached fragments, some-

* Lord Walsingham, in the "Microlepidoptera of Tenerife" (Proc. Zool. Soc. Lond., 976, 1907), has revived the name *Phyllonorycter* Hb. for this genus.

times inaccessible, has also been a reason for giving new, complete descriptions.

Three European species, formerly included in our fauna, are omitted in the present revision, viz.: *alniella* Zell., *blancardella* Fab. and *faginella* Zell. There is no authentic record of an American specimen of *alniella*; *blancardella* was included in our lists on the ground of the supposed synonomy of Clemens' *cratægella* with this species; the occurrence of *faginella* was based upon the determination by Lord Walsingham of a specimen in Dr. Riley's collection. An examination of this specimen in the National Museum discloses the fact that although a closely related species, it is very distinct from the true *faginella* of Europe.

In many cases, where species feed upon plants having a wide distribution, and are known to occur in widely separated localities, it is probable that the range of the species coincides with that of its food plant, and no specific localities have been given for such species. This is especially true where the distribution of the food plant covers the territory included in the Alleghanian, Carolinian and Austroriparian areas, the "Atlantic States" of Dyar's List.

My thanks are due to Mr. W. D. Kearfott for the loan of a large number of specimens with notes on their life history, for literature upon the genus, and for the encouragement and assistance which have made my work possible.

To Dr. Edward Meyrick of Marlborough, England, to whose consideration the proposed division of the genus was submitted, I am indebted for the expression of his opinion on the establishment of the subgenera, and also for the comparison of several American species with closely related European ones.

Through the kindness of Dr. Henry Skinner of the Academy of Natural Sciences of Philadelphia, and Prof. Samuel Henshaw of the Museum of Comparative Zoology at Cambridge, Mass., I was given every opportunity to examine and sketch the many valuable types of species of this genus.

Dr. James Fletcher has sent me a number of Canadian species for examination, for which privilege I return thanks.

I am under obligations to the U. S. National Museum for the loan of material, and to Dr. Harrison G. Dyar and Mr. August Busck for their courtesy while examining the collection at Washington.

Mr. G. R. Pilate has kindly sent me mines of a number of species from California.

I gratefully acknowledge the assistance I have received from the University of Cincinnati, and my thanks are due to Dr. M. F. Guyer for his interest and suggestions during the progress of my work.

ANNETTE F. BRAUN.

Genus LITHOCOLLETIS.

This genus was originally established for a number of European species, which conform to the conception of the genus as defined by Dr. Meyrick in his "Handbook of British Lepidoptera," p. 733. Among our species there are in addition to the typical *Lithocolletis*, two other groups, distinguished by structural differences, not great enough to warrant the establishment of new genera. In accordance with the opinion expressed by Dr. Meyrick in response to questions regarding the value of these variations in the division of the genus, the *solidaginis* group and that represented by *desmodiella* have been ranked as subgenera, but the flat larval group is treated as "a natural and definable group of the genus."

In order to include all of the American species, the definition of the genus must be somewhat broadened, and it may then be characterized as follows:

Head (Plate XX, fig. 9).—Face smooth, crown rough tufted. Labial palpi porrected or drooping, moderately long, pointed. Maxillary palpi rudimentary. Tongue moderate. Antennæ nearly attaining the wing length, simple in the male, basal joint thickened, bearing a pecten (without a pecten in subgenus *Porphyrosela*).

Forewings elongate, lanceolate, acuminate.

Hindwings about one-half the breadth of the forewings, linear lanceolate, cilia 4–5.

Venation (Plate XX, Figs. 1, 2, 3, 4, 5, 6, 7, 8).—Forewings: 1*b* simple, 3 absent, 4 absent, 5 absent (typical *Lithocolletis* and *Porphyrosela*), 5* and 6 stalked (subgenus *Cremastobombycia*), 7 to costa, 8 absent, 10 absent, 11 absent (subgenus *Porphyrosela*). Hindwings: 3 absent, 4 absent, transverse vein absent between 2 and 5, 6 absent (typical *Lithocolletis* and *Porphyrosela*), 5 and 6* long stalked (subgenus *Cremastobombycia*).

Posterior tibiæ with appressed hairs (except in subgenus *Porphyrosela*).

All of the species of which the life history is known are leaf miners throughout their entire larval existence, and all, with the exception of *ostensackenella*, pupate within the mine.

The three divisions may be separated by the following characters:

* Discovery of more primitive forms, with more complete venation, may necessitate a change in the interpretation of this venation.

Forewings with 5 absent; hindwings with 6 absent.
Vein 11 of the forewings absent; posterior tibiæ without hairs.
Subgenus **Porphyrosela.**
Vein 11 of the forewings present; posterior tibiæ with appressed hairs.
Lithocolletis Hb.
Forewings with 5 and 6 stalked; hindwings with 5 and 6 stalked.
Subgenus **Cremastobombycia.**

LITHOCOLLETIS Hübner.

Characters of *Lithocolletis* as given in Meyrick's "Handbook of British Lepidoptera," 1895, p. 733.

Head (Plate XX, Fig. 9).—Face smooth, crown rough tufted. Labial palpi porrected or drooping, moderately long, pointed. Maxillary palpi rudimentary. Tongue moderate. Antennæ nearly attaining the wing length, simple in male, basal joint thickened, bearing a pecten.

Forewings elongate, lanceolate, acuminate.

Hindwings about one-half the breadth of the forewings, linear lanceolate, cilia 4–5.

Venation (Plate XX, Figs. 1, 2, 3, 4, 5).—Forewings: 1*b* simple, 3–5 absent, 7 to costa, 8 absent, 10 absent. Hindwings: 3 absent, 4 absent, transverse vein absent between 2 and 5, 6 absent.

Posterior tibiæ with appressed hairs.

Our representatives fall naturally into two distinct and well defined groups, identical, however, in structural details of the imago. The first, comprising those species having a cylindrical larva, agrees closely with the European species in embryonic stages and in type of markings of the imago. The second group includes all those species having a flattened larva, and is characterized by a definite type of wing marking.

Most of the species are included in this division, which is well represented in all parts of the country. A very few of the species occur throughout the entire country; others are of comparatively wide distribution; a few appear to be confined to a very limited area.

The following characters will separate the two groups:

Larva cylindrical; white streaks and fasciæ dark margined internally...Group I.
Larva flattened; white streaks and fasciæ dark margined externally...Group II.

GROUP I.

The larva of the *first group* (Plate XX, fig. 11) is cylindrical or subcylindrical in form, and has, beside the thoracic legs, four pair of prolegs, on 7, 8, 9 and 13. It is usually of a pale greenish or yellowish color.

The mine may be placed upon either the upper or lower surface, but in either case the loosened epidermis is lined with silk, causing it to contract, thus producing a roomy, tent-like mine. The mine is at first narrow, somewhat winding, but soon spreads out into a blotch, which sometimes includes the earlier winding portion. The outline of the loosened epidermis represents the final size of the mine, no further increase taking place. The mine may be oval or circular, or in a few cases, nearly rectangular in shape, sometimes limited by two veins. Usually the larva feeds from the circumference inwardly; sometimes it begins at one end, and sometimes it feeds irregularly in spots.

With the exception of *ostensackenella*, which leaves the mine to pupate, the pupa is formed within the mine, and may or may not be enclosed in a cocoon. In the latter case, it is usually suspended in the mine by a thin meshwork of silken threads. Where a cocoon is present, several varieties may be distinguished. It may be rather small, ovoid, formed of frass and silk; large, loosely woven, semi-transparent, occupying sometimes nearly one-half the mine; or an oval ring with outlines formed of frass.

The forewings of the imagoes are usually of some shade of yellow or brown, sometimes, however, with the basal two-thirds almost pure shining white. Upon this yellowish ground color, the more or less white markings appear. The transverse markings consist of costal and dorsal streaks, usually curved and oblique, slightly curved or angulated fasciæ or combinations of these. These streaks or fasciæ are usually margined with darker scales toward the base; the internal margins of some of the streaks are sometimes lacking. In a few species some or all of the streaks or fasciæ may be more or less margined externally also, but in no case is the external margin heavier than the internal one, and in no case is an external margin present, when the internal one is absent. Longitudinal markings, when present, consist of a median streak from the base, sometimes accompanied by streaks along the costal and dorsal margins. The

apex sometimes contains a well-defined, regularly shaped black dot, formed of closely overlapping scales. In other species, these scales are more or less scattered.

In the synoptic table, and as a factor in the sequence of the species, the use of the term "apical spot" or "apical dot" has been restricted to those species in which the apical dot is circular or nearly so, and is not connected with a streak of scattered scales extending along the middle of the wing before the apex. *L. fitchella* and *L. lucidicostella* possess typical apical dots. Typically, this dot is placed at the apex of the wing membrane. In intermediate forms, such as *morrisella, uhlerella, gemmea*, the apical spot may be so increased in size as to occupy the entire apical portion of the wing.

The white costal and dorsal streaks occupy the interspaces between the veins. The veins then, within certain variable limits, determine the position of these marks. The first costal streak is placed beyond vein 12, and is the most variable in position; the second just before 11; the third between 11 and 9; the fourth between 9 and 7; rarely a fifth between 7 and the apex. In those species with but three costal streaks, the one between 9 and 7 is absent, and vein 9 reaches the costa nearer the apex, permitting the third costal streak to be shifted backward.

Of the dorsal streaks those at the tornus and beyond it are the most constant in position. Those along the dorsal margin have no defined position.

The species may be separated as follows:

A. Ground color of the forewings pure white, marked with fuscous irrorated bands and bars ..... **bataviella.**

AA. Ground color of the forewings not entirely pure white.

B. Forewings dusted with fuscous scales.

C. Costal and dorsal streaks large, conspicuous and curved backward.

D. Size large (9–10.5 mm.); ground color reddish... **tremuloidiella.**

DD. Size moderate (7–8 mm.); ground color not reddish. **salicifoliella.**

CC. Costal and dorsal streaks narrow, straight, forming angulated fasciæ. **celtifoliella.**

BB. Forewings not dusted.

C. With an apical dot (indistinct in *arbutusella, insignis* and *obsoleta*).

D. Without a complete median fascia.

E. One white dorsal streak before the tornus.

F. Two white costal streaks ..... **trinotella.**

FF. Three white costal streaks..... **quercialbella.**

FFF. Four white costal streaks.
G. Basal half of forewings pure white .....**clemensella.**
GG. A golden basal streak from base to near middle.
H. Basal streak margined with dark brown on its lower edge.
argentifimbriella.
HH. Basal streak unmargined.....**incidicostella.**
EE. Two white dorsal streaks before the tornus.
F. With a median pale basal streak.
G. Basal streak extended across the fold to the dorsum.
H. Basal streak confluent with the upper edge of the first dorsal streak .....**insignis.**
HH. Basal streak not confluent with the first dorsal streak.
I. Basal streak extended to the costa.....**arbutusella.**
II. Basal streak not extended to the costa.....**hageni.**
GG. Basal streak not extended to the dorsum.
H. Basal streak confluent with the upper edge of the first dorsal streak .....**insignis.**
HH. Basal streak not confluent with the first dorsal streak.
I. First dorsal streak short and broad, produced to the base.
albanotella.
II. First dorsal streak extending more than half way across the wing.
J. A white costal streak from base to one-third...**rileyella.**
JJ. No such streak.
K. Basal streak dark margined toward costa.
L. First dorsal streak very long, reaching apex of second costal .....**obscuricostella.**
LL. Apex of first dorsal streak opposite that of first costal.
M. Head and thorax white ....**oliviformis.**
MM. Head and thorax reddish-saffron.
kearfottella.
KK. Basal streak unmargined.
L. Thorax and basal portion of forewings shining white.
caryæalbella.
LL. Thorax and basal portion of forewings not white.
ostryæfoliella.
FF. Without a median pale basal streak.
G. Apex of first dorsal streak opposite the apex of second costal.
H. First dorsal streak very large.....**fitchella.**
HH. First dorsal streak not larger than opposite costal streak.
robiniella.
GG. Apex of first dorsal streak opposite the apex of first costal.
H. Pale markings very indistinct.....**obsoleta.**
HH. Pale markings well defined.
I. Apex of second dorsal streak opposite the space between the second and third costal streaks; margins of opposite streaks never uniting.....**sexnotella.**
II. Apex of second dorsal streak opposite second costal; margins of opposite streaks uniting ..... **seriferella.**

EEE. Three large white dorsal streaks before the tornus, curving backward ..... **leucothorax.**

DD. With a complete median fascia.

E. Three posterior costal streaks ..... **martiella.**

EE. Two posterior costal streaks.

F. Dorsal half of the wing below the fold dark brown.

G. A silvery basal streak in the fold ..... **morrisella.**

GG. No basal streak ..... **uhlerella.**

FF. Dorsal half of the wings not darkened ..... **gemmea.**

CC. Without an apical dot.

D. Oblique costal and dorsal streaks, rarely meeting; no straight fascia, sometimes one acutely angulated fascia.

E. Basal streak very short and indistinct ..... **anromitens.**

EE. Basal streak long.

F. A median angulated fascia of equal width throughout; white marks dusted internally ..... **celtisella.**

FF. Fascia, if present, formed by the meeting of opposite streaks.

G. With three long dorsal streaks before the tornus.

H. Five costal streaks ..... **argentinotella.**

HH. Two costal streaks, first opposite second dorsal streak. **occitanica.**

GG. With two dorsal streaks before the tornus.

H. Basal streak unmargined, or margined toward its apex only.

I. Markings usually very indistinct and ill-defined; sometimes a median angulated fascia ..... **apicinigrella.**

II. Markings well defined; never with a median fascia.

J. Basal streak confluent with the upper edge of the first dorsal streak.

K. Forewings pale, grayish ..... **salicivorella.**

KK. Forewings not grayish ..... **deceptusella.**

JJ. Basal streak not confluent with first dorsal streak.

K. First pair of streaks very oblique and extended along the margins to base ..... **basistrigella.**

KK. First pair of streaks not extended to base.

L. Apical third of basal streak bent toward costa.

M. Margin of first dorsal streak bent backward on fold ..... **scudderella.**

MM. Margin of first dorsal streak not bent backward on fold ..... **diaphanella.**

LL. Basal streak straight or curved downward. **incanella.**

HH. Basal streak dark margined toward the costa.

I. Costal margin white from base to near one-third. **populiella.**

II. Costal margin not white from base.

J. Three costal streaks ..... **malimalifoliella.**

JJ. Four costal streaks.

K. Posterior tarsi whitish.
L. Two dorsal streaks above the tornus, each uniting with its corresponding costal streak.....**ledella.**
LL. One dorsal streak above the tornus.....**alni.**
alnicolella.
KK. Posterior tarsi fuscous above, or tipped with black.
L. First dorsal streak short, not attaining the fold.
minutella.
LL. First dorsal streak very long.
M. First dorsal streak beginning much nearer the base than first costal; expanse 8-9 mm.
propinquinella.
MM. First dorsal streak beginning nearly opposite first costal, expanse 6.5-7 mm..... **cratægella.**
DD. Usually two complete fasciæ; if but one, median and nearly straight.
E. A median fascia; two posterior costal streaks.
F. Basal portion of the wing shining white.....**lucetiella.**
FF. Basal portion of the wing golden.....**symphoricarpella.**
EE. Two complete fasciæ.
F. Head and thorax pure white .....**tiliacella.**
FF. Head and thorax not white.
G. Two posterior costal streaks.
H. Head and base of wings dark brown..**ostensackenella.**
HH. Head and base of wings not dark brown.
I. Fasciæ nearly straight.
J. Apex of wing dusted .....**tritæniamella.**
JJ. Apex of wing not dusted .....**affinis.**
II. Fasciæ distinctly bent outward near the middle.
mariæella.
GG. Three posterior costal streaks.
H. Costal arm of each fascia broadly dusted internally.
fragilella.
HH. Fasciæ not dusted internally.....**oregoneusis.**

Lithocolletis fitchella Clemens.

(Plate XXI, Fig. 1.)

Lithocolletis fitchella Clem., Proc. Acad. Nat. Sci. Phil., 207, 1860.—Tin. No. Am., 139, 1872.—Chambers, Can. Ent., iii, 183, 1871.—Cin. Quart. Jn. Sci., i, 201, 1874.—Packard, Guide Stud. Ins., 353, 1869.—Chambers, Bull. Geol. Surv. Terr., iii, 139, 1877.—Can. Ent., xi, 90, 1879.—Frey and Boll, Stett. ent. Zeit., xxxix, 260, 1878.—Busck, Proc. Ent. Soc. Wash., v, 204, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6253.

Syn. *quercifoliella* Fitch, Fifth Rept. Ins. N. Y., 327, 1859.—*quercitorum* Frey and Boll, Stett. ent. Zeit., xxxiv, 207, 1873.—Zeller, Verh. zool.-bot. Ges. Wien., xxv, 346, 1875.—Chambers, Cin. Quart. Jn. Sci., i, 201, 1874; ii, 229, 1875.—Bull. Geol. Surv. Terr., iii. 139, 141, 1877.

"Head, face and thorax silvery white. Labial palpi tipped with pale ocherous. Antennæ pale saffron; basal joint silvery white. Forewings pale reddish-saffron; with a slight brassy hue. Along the costa are five silvery-white costal

streaks, all black-margined internally except the first, which is very oblique and continued along the costa to the base of the wing. All the costal streaks are short except the first. On the inner margin are two conspicuous silvery dorsal streaks, dark-margined internally, the first very large, and placed near the middle of the inner margin, the second opposite the third costal streak. At the tip is a small round black spot, placed above the middle of the wing. Cilia silvery gray tinted with saffron. Hindwings grayish fuscous; cilia paler."

The above is a reprint of Clemens' description. Although Clemens makes no mention of it in his description, there is a very distinct black hook in the cilia above the apical spot. Alar expanse 7.5–8 mm.

The larva mines the underside of oak leaves, forming a tentiform mine, of which the loosened epidermis is slightly wrinkled at maturity. The pupa is suspended in a slight web of silk.

Lithocolletis leucothorax Walsingham.

Plate XXI, Fig. 2.

Lithocolletis leucothorax Walsingham, Proc. U. S. Nat. Mus., xxxiii, 223, 1907.

"Antennæ pale saffron. Palpi white. Head pale saffron; face white.

"Forewings pale saffron, the extreme costa whitish from the base, with two very oblique, shining whitish costal streaks tending outward, the first at the middle, the second beyond it, and two much shorter streaks in the costal cilia pointing inward—all anteriorly dark margined; on the dorsum are three very conspicuous, broad, white streaks, tending obliquely outward, the first and second before the middle, the third beyond it—these are all also anteriorly margined with ferruginous, the ferruginous shades bent outward about the middle of the wing giving them an angulated appearance; cilia shining, saffron, a small blackish apical dot and a dark line running from it through the cilia toward the tornus. Alar expanse 8.5 mm.

"Hindwings whitish gray; cilia grayish. Abdomen tinged with saffron; anal tuft grayish. Hind tibiæ yellowish white, very faintly spotted."

Described by Lord Walsingham from a specimen collected by Mr. A. Koebele, in the Santa Cruz Mountains, California. Mr. W. D. Kearfott has this species from Colfax, Placer County, California, May 1–10th (A. H. Vachell, collector).

Lithocolletis bataviella sp. nov.

Plate XXI, Fig. 3.

Antennæ whitish, banded above with dark gray. Face and palpi white. Tuft white and gray intermixed.

Thorax white, dusted with gray scales. Forewings white; the markings consisting of darker angulated fasciæ formed by gray-tipped whitish scales, with a faint golden brown lustre at their bases. At the base of the costa, is a patch of these scales. Within the basal fourth is an angulated fascia, sometimes consisting only of the line of black scales which forms its outer border, and sometimes

interrupted beneath the angle; sometimes the gray scales extend to the base of the wing. Just before the middle is a second angulated fascia, with its dorsal arm more nearly perpendicular than that of the first fascia, also dark margined on its outer side. Beyond this is a somewhat Y-shaped mark, with its arms resting on the costa and enclosing between them a small inwardly dark margined white costal streak. The outer margin of this mark is angulated or interrupted, emitting at the angle a streak of gray scales. This streak unites with an outwardly concave fascia near the apex. The apical part of the wing is dusted with gray scales, with a few black scales at the apex. A marginal row of gray-tipped scales passes around the apex to the tornus. Cilia pale gray. Expanse 7-7.5 mm.

Hindwings and cilia gray. Abdomen gray above, with paler anal tuft, whitish beneath. Legs pale grayish, tarsi tipped with black.

Described from eight specimens, Cincinnati, Ohio, April 13–29th.

Not closely related to any described American species, but approaching the European *sylvella* more closely than any other species.

Lithocolletis trinotella Braun.

Plate XXI, Fig. 4.

Lithocolletis trinotella Braun, Ent. News, xix, 99, 1908.

Palpi, face, tuft and antennæ glistening snowy white; antennæ faintly annulate above with ocherous.

Thorax and basal two-thirds of the forewings glistening white, below the fold somewhat suffused with yellow; apical third of the wings pale golden. A pale golden basal streak begins on the costa, extends nearly parallel to the costa for one-fourth the wing length, then is bent downward and passes parallel to the fold into the golden apical portion of the wing. In the apical portion there are two costal white wedge-shaped streaks and a similar dorsal one just before the tornus, opposite the first costal streak; all are internally margined with pale fuscous. A black apical spot. A pale fuscous marginal line in the cilia. Cilia whitish, faintly tinged with yellow. Alar expanse 5 mm.

Hindwings and cilia whitish. Abdomen pale grayish ocherous above, whitish beneath. Legs whitish.

The unique type, a male, was taken in Essex County Park, New Jersey, by Mr. W. D. Kearfott, April 26th.

Lithocolletis quercialbella Fitch.

Plate XXI, Fig. 5.

Argyromiges quercialbella Fitch, Rept. Ins. N. Y., v, 328, 1859.

Lithocolletis quercialbella Chambers, Can. Ent., iii, 57, 1871.—Walsingham, Ins. Life, ii, 25, 1889; iii, 325, 1891.—Dyar, Bull., 52, U. S. Nat. Mus., 1902, No. 6259.

Syn. *quercibella* Chambers, Cin. Quart. Jn. Sci., ii, 102, 1875.—Walsingham, Ins. Life, ii, 77, 1889.—*quercipulchella* Chambers, Bull. Geol. Surv. Terr., iv, 120, 1878.—Packard, Bull. Ent. Comm., vii, 53, 1881.—Walsingham, Ins. Life, ii, 77, 1889.—*quercipulchrella* Riley, Smith's List Lep. Bor. Am., 109, 1891.

Face, palpi, tuft and antennæ white, extreme tips of antennæ dark brown Thorax and basal two-thirds of the forewings shining white; apical third suffused with golden. A rather broad golden basal streak begins at the base on the costa and extends parallel to the fold, to the middle of the wing. In the apical golden portion of the wing, there are three costal white streaks, all dark margined internally, and nearly perpendicular to the margin. Opposite the first costal streak a dorsal white streak, dark margined internally; opposite the second costal streak is a second indistinct dorsal streak. A black apical spot. Cilia whitish, tipped with fuscous around the apex. Marginal line in the cilia dark brown. Expanse 7 mm.

Hindwings and cilia pale grayish ocherous. Abdomen grayish ocherous above, whitish beneath. Legs whitish ocherous.

Eastern United States.

The larvæ make tentiform mines on the underside of the leaves of various species of oak.

Fitch in his description says "three or four costal streaks," making the description applicable to two species, *argentifimbriella* Clem. and *quercialbella* Fitch. Lord Walsingham (Ins. Life, iii, 326, 1891) distinguishes *quercialbella* from *argentifimbriella* by its having three instead of four costal streaks. In order to avoid needless confusion, the name *quercialbella* should be retained for the species having three costal streaks, although Fitch's supposed type of *quercialbella* in the U. S. Nat. Mus. collection is a specimen of *argentifimbriella.*

Lithocolletis clemensella Chambers.

(Plate XXI, Fig. 6.)

Lithocolletis clemensella Chambers, Can. Ent., iii, 57, 85, 1871; xi, 91, 1879.—Walsingham, Ins. Life, ii, 25, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902. No. 6256.

"Silvery or glistening white. Antennæ annulate above with brownish. Apical half of the anterior wings pale golden, with four silvery white costal and two dorsal streaks all dark margined internally. The dark margin of the first costal streak distinct, oblique, and produced along the costa towards the base. The first dorsal streak opposite to the second costal, oblique pointing to the third costal. No basal streak. Apical spot black, nearly circular. Hinder marginal line at the base of the dorsal cilia brownish, broad, continuous with the hind margin of the second dorsal streak, and reaching to but not passing around the apical spot; cilia silvery-tinged with pale golden. Alar expanse one-fourth inch. Kentucky—common."

The above is Chambers' description of the species. It is common at Cincinnati, Ohio, and may be bred from tentiform mines on the underside of leaves of sugar maple. The pupa is suspended in the mine by a few silken threads. The expanse of the imago is 6–6.5 mm.

Lithocolletis argentifimbriella Clemens.

Plate XXI, Fig. 7.

Lithocolletis argentifimbriella Clemens, Proc. Acad. Nat. Sci. Phil., 318, 321, 1859.—Tin. No. Am., 39, 64, 70, 1872.—Chambers, Can. Ent., iii, 57, 85, 1871.—Cin. Quart. Jn. Sci., i, 201, 1874; ii, 229, 1875.—Frey and Boll, Stett. ent. Zeit., xxxiv, 209, 1873.—Walsingham, Ins. Life, iii, 325, 1891.—Busck, Proc. Ent. Soc. Wash., v, 188, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6258.

Syn. *longistriata* Frey and Boll, Stett. ent. Zeit., xxxiv, 209, 1873.—Chambers, Cin. Quart. Jn. Sci., ii, 229, 1875.—Walsingham, Ins. Life, ii, 325, 1891. *longirostrata* Dyar, Bull. 52, U. S. Nat. Mus., 550, 1902.—*fuscocostella* Chambers, Cin. Quart. Jn. Sci., ii, 102, 1875 —Walsingham, Ins. Life, ii, 25, 1889.

"Antennæ silvery, annulated with darkish brown. Head, front and thorax silvery-white. Anterior wings silvery, pale golden from nearly the middle to the tip, with a long basal dark brown streak margined above with golden, extending nearly to the first costal streak. There are four silvery costal streaks, all dark margined, the first very oblique, the second convex toward the base of the wing. The first costal dark margin is decided and extended on the costa toward the base. Two silvery dark margined dorsal streaks, the first opposite the second costal streak. The apical spot black, hinder marginal line dark brown, cilia silver-gray. Hindwings silver-gray, cilia the same."

The above is Clemens' description.

The larva makes a tentiform mine on the underside of leaves of oaks. The pupa is suspended in the mine in a thin web.

The imago may easily be distinguished from *L. lucidicostella*, which it most closely resembles, by having a less portion of the wing golden; and by differences in the basal streak, which in *L. argentifimbriella* is longer, narrower and dark brown, margined above by a narrow golden line. In *L. lucidicostella* the basal streak is entirely golden. Expanse 6.5–7 mm.

The type of *longistriata* F. & B. at the Museum of Comparative Zoology, Cambridge, Mass., is identical with *argentifimbriella* Clem.

Lithocolletis lucidicostella Clemens.

Plate XXI, Fig. 8.

Lithocolletis lucidicostella Clemens, Proc. Acad. Nat. Sci. Phil., 318, 1859.—Tin. No. Am., 39, 64, 66, 1872.—Chambers, Cin. Quart. Jn. Sci., ii, 102, 1875.—Can. Ent., iii, 57, 1871.—Busck, Proc. Ent. Soc. Wash., v, 187, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6257.

Syn. *ludicostella* Riley, Smith's List Lep. Bor. Am., 109, 1891.

"Antennæ white. Head and tuft silvery white. Forewings, basal portion silvery white to the middle, with a discal pale golden streak from the base, retreating from the costa before reaching the middle of the wing and somewhat

suffused with golden beneath the fold. From the middle to the tip pale golden, with four costal silvery streaks, dark margined internally and two dorsal silvery streaks, the first opposite the second costal streak and both dark margined internally; *the first costal streak not decidedly dark margined.* Apical spot black. Hinder marginal line in the cilia dark brown; cilia pale gray. Hindwings shining bluish gray; cilia gray.

"The larva mines the under side of the maple leaf, *Acer saccharinum*, in July, September and October. The head is pale brown; body pale green, colored darker by the ingesta. "Frass" collected into a ball within the mine. The pupa is suspended in a web of silk within the mine."

The above is Clemens' description. As noticed by Stainton, the statement, "the first costal streak not decidedly dark margined," is an error. This streak is decidedly dark margined, as is also the first dorsal. The extent of the wing suffused with golden also varies; in some specimens being merely a golden line extending from the golden apical half of the wing along the fold toward the base; in others the entire basal half of the wing below the fold is golden. Expanse 6.5 mm.

Lithocolletis albanotella Chambers.

Plate XXI, Fig. 9.

Lithocolletis albanotella Chambers, Cin. Quart. Jn. Sci., ii, 101, 1875.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6263.

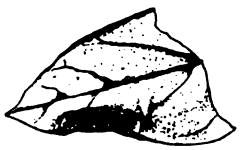
Syn. *subaureola* Frey and Boll, Stett. ent. Zeit., xxxix, 262, 1878.—Walsingham, Ins. Life, ii, 25, 1889; iii, 325, 1891.—Dyar, Bull. 52, U. S. Nat. Mus., No. 6260.

Antennæ white, dark brown at the apex. Face and palpi shining snow-white. Tuft white, mixed with pale yellowish brown scales.

Thorax shining white. Forewings pale golden brown. There is a broad white basal streak ending in a point at about two-fifths of the wing length and black margined toward the costa. At the basal third is a very oblique costal streak, with its internal black margin produced along the costa to the base. Opposite to its apex is the apex of the larger first dorsal streak, which is continued as a broad band along the dorsal margin to the base. Near the base it is confluent with the basal streak, leaving only a narrow streak of the ground color between its apex and the basal streak. The black margin at the apex of the first dorsal streak extends along its upper edge toward the base for a greater or less distance. In the apical half of the wing are three costal and one or two dorsal streaks. Second costal and dorsal streaks opposite each other, sometimes meeting, and their oblique dark internal margins often uniting in the middle of the wing. Third and fourth costal streaks nearly perpendicular, the fourth sometimes unmargined, the third opposite the third dorsal streak, which is often small or indicated by its dark margin only. A black apical spot with a few silvery scales before it. A dark marginal line in the cilia, which are pale golden around the apex, with a gray streak below the fourth costal streak, shading to grayish white toward the tornus. Expanse 6-7.5 mm.

Hindwings and cilia pale grayish ocherous in the male, more ocherous in the female. Abdomen above, gray in the male, ocherous in the female, whitish beneath. Legs and tarsi whitish gray, except the first pair, which are fuscous on their anterior edges.

Ohio, Kentucky (Chambers), Texas (Boll). Chambers records it on *Quercus nigra* L.; Boll bred it from *Quercus macrocarpa* Michx. in Texas. I have bred it at Cincinnati on *Quercus macrocarpa* and *Quercus platanoides*. The rather small tentiform mine may be placed either at the edge of the leaf or between two veins, the loosened epidermis being thrown into numerous longitudinal wrinkles. The pupa is enclosed in in a rather large semi-transparent ovoid silken cocoon.



Mine of *L. albanotella*.

The type of Chambers' *albanotella* at Cambridge consists of abdomen and hind wings only, which are pale grayish ocherous. His description of the species was made from a rubbed specimen, but agrees with that of *subaureola* in all details, with the exception of "basal fourth of the costa white." As Chambers' type was a female, and in the female the costal portion of the wings toward the base is much paler, this error in the description was probably due to the condition of his specimen.

Lithocolletis insignis Walsingham.

Plate XXI, Fig. 10.

Lithocolletis insignis Walsingham, Ins. Life, ii, 117, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6255.

"Antennæ yellowish, unspotted. Palpi white. Face white, frontal tuft white, with a few saffron scales. Thorax white.

"Forewings pale saffron, with a rather golden tinge; a broad white basal streak on the upper half of the wing, running parallel to the costal margin for one-third the wing length, thence deflexed and confluent with the middle of the upper edge of the first very broad white dorsal streak. The basal streak is sometimes extended at the base across the fold reaching to the dorsal margin, thus leaving between itself and the first dorsal streak a small curved oblique saffron streak; sometimes it is not thus projected across the fold, but upon the dorsal margin beneath it is found a separate short dorso-basal white dash. Above and slightly beyond the point at which the broad basal streak is deflexed there is a very oblique costal streak, somewhat triangular, with its apex reaching nearly to the apex of the much larger first dorsal streak below it; beyond this the second streak, situated just beyond the middle of the costal margin, is of about the same size, also triangular, a little less oblique, and corresponding with a wider and more conspicuous white dorsal patch opposite to it. The third and fourth

costal streaks, of which the former points slightly outwards. The latter is perpendicular, reaching nearly (or in some specimens quite) to a white patch on the dorsal margin before the apex, which seems to consist of two confluent white dorsal streaks. At the extreme apex is a minute black apical spot, surrounded by a semi-circular dark line at the base of the apical cilia, which are tinged with golden saffron at the extreme apex. Beneath the apex the cilia are white, blending into saffron-gray about and before the anal angle; all the white markings are distinctly dark margined on all sides. The white streaks on the forewings of this species are so large and conspicuous as in some cases to almost obliterate the pale saffron ground color, and different specimens vary much in the proportionate space occupied by one and the other.

"Hindwings and cilia pale gray. Abdomen and anal tuft grayish white. Hind tarsi whitish, spotted above with gray. Expanse alar, 9 mm."

This species was described as above by Lord Walsingham from specimens collected in California in 1871, in Lake and Mendocino Counties in June, and on Mt. Shasta, Siskiyou County, in August. In Mr. Kearfott's collection, there is a specimen of this species from Carmel, California, taken in June (A. H. Vachell, collector).

Lithocolletis hageni Frey and Boll.

Plate XXI. Fig. 11.

Lithocolletis hageni Frey and Boll, Stett. ent. Zeit., xxxiv, 208, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 201, 1874.—Bull. Geol. Surv. Terr., iv, 100, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6252.

Syn. *necospinusella* Chambers, Bull. Geol. Surv. Terr., iv, 100, 1878.—Can. Ent., xi, 144, 1879.

Face, head and thorax white. Palpi white. Scales of the tuft mixed with gray. Antennæ remarkably dark gray, with the basal joint white. Upper side of the abdomen dark gray. Anal tuft somewhat lighter, tinged with yellow. The underside of the abdomen is brownish white; as are likewise the legs, the tarsi on the outside being obscurely dark spotted. The ground color of the forewings is a deep saffron brown. The white spots are greatly developed on the dorsal margin, but, on the contrary, only slightly on the costa. Here, beginning just before the middle of the costal margin, are four white streaks dark margined on both sides. The first is placed very obliquely, the second less so, the two last are placed transversely on the wing, are bent, and their apices point toward the tornus. At the base of the dorsal margin there is a very large white spot. It forms an irregular quadrilateral, which approaches the costa, extends parallel to it, and is prolonged to a point on the fold. An obliquely placed transverse band of the saffron brown ground color, very much darkened, borders this spot behind. Then follows a second white mark, in the shape of an irregular triangular, whose broad base rests upon the dorsal margin. There follows a second, also very much darkened shorter transverse band. It ends at one-half the wing length. Behind this at the tornus, we see finally the last white triangle. At the apex of the wing there is a black dot. A well defined black streak extends from this dot into the whitish cilia. A peculiar glistening blue line extends along the base of the cilia. This line becomes very noticeably slightly concave before the tornus.

The hindwings moderately dark gray, their cilia somewhat lighter. Underside brownish dark gray. The second white dorsal spot usually shows through as a lighter shade.

The larvæ have almost the same habits as those of *quercitorum* on the underside of leaves of *Quercus Prinus* L. and *Quercus Castanea* Willd. However, the mine is more wrinkled, and hence the leaf is more strongly drawn together and is somewhat gray.

The imagoes emerge in April and May.

The above is a translation of Frey's original description (Stett. ent. Zeit., xxxiv, 208, 1873).

The tuft is saffron brown at the sides. Thorax white, except a narrow brown stripe across the anterior edge of the patagia. The position of a fourth dorsal streak above the tornus is indicated by its dark margin. On large specimens a fifth small white costal streak is sometimes present. The apex of the large white basal dorsal streak is above the fold, not on the fold. Alar expanse 7.5–10 mm.

I have bred this species from mines on the underside of *Quercus platanoides* (Lam.) Sudw. The pupa is suspended in a few silken threads.

Lithocolletis arbutusella sp. nov.

Plate XXI, Fig. 12.

Male.—Antennæ whitish, annulate with gray. Face and palpi yellowish white. Tuft brown, mixed with ochreous and white scales.

Thorax whitish, with the anterior portion darkened with grayish brown scales. Forewings pale reddish ochreous. At the basal fourth of the dorsum, there is a curved oblique line of brown scales, uniting at a very acute angle with a shorter curved costal line, thus enclosing a white basal patch, suffused with pale ocherous toward the base and costa and darkened along the costa with grayish brown scales. There is a small patch of similar dark scales on the dorsum near the base. Just before the middle of the wing is an oblique white costal streak dark margined on both sides. Nearly opposite it is a large oblique curved dorsal streak also dark margined on both sides, the dark margin being continued from the apex along the middle of the wing to the apex of the second dorsal streak. The anterior margin of the second very broad dorsal streak is formed by a line of brown scales beginning on the dorsum a little anterior to the apex of the first dorsal streak, bent backward along the fold, then directed upward. The nearly perpendicular external margin of this streak is formed of a few scattered scales. Second costal streak very long, narrow and oblique, margined internally only, and ending just above the apex of the second dorsal streak. From here to near the apex, the middle of the wing is dusted with whitish scales. Third costal streak triangular and inwardly oblique. Fourth costal streak small. A small patch of brown scales in the apical portion of the wing, from which an indistinct line of brown scales extends to the tornus. A brown line in the cilia passes around the apex from the fourth costal streak to the tornus. Cilia pale grayish. Alar expanse 8 mm.

Hindwings, cilia and upper side of abdomen gray. Hind tibiæ reddish gray, their tarsi white, with broad black annulations.

Female.—The female shows the following differences: face and palpi white, antennæ white, grayish toward the apex. Tuft white, with a few brown scales. Thorax and basal portion of the wings almost pure white. The apical portion of the wings is also more suffused with white. Hindwings and cilia almost pure white. Abdomen silvery gray. Legs white, tarsi with black annulations.

Type.—No. 12002, U. S. Nat. Mus.

San Mateo Co., California. Two specimens bred from *Arbutus menziesii* in September, and bearing the record number 243.

Lithocolletis obscuricostella Clemens.

Plate XXI, Fig. 13.

Lithocolletis obscuricostella Clemens, Proc. Acad. Nat. Sci. Phil., 321, 1859.—Tin. No. Am., 64, 71, 1872.—Chambers, Can. Ent., iii, 85, 1871; xi, 92, 1879. —Busck, Proc. Ent. Soc. Wash., v, 188, 1903.

Syn. *virginiella* Chambers, Can. Ent., iii, 84, 1871.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6280.

"Head and frontal tuft silvery. Thorax very pale golden. Forewings pale golden with a silvery median stripe from the base, black margined toward the costa, extending to the middle of the wing; with four silvery costal streaks, the first very oblique and rather long, and all except the last black margined internally, the margin of the first being long and the continuation of a black streak from the base along the extreme costa. Three silvery dorsal streaks, the first quite long, obliquely curved and opposite the first costal streak, and the first two black margined internally; the second dorsal obliquely opposite the third costal streak. Apical spot black; hinder marginal line black, cilia grayish. Hind wings bluish gray, cilia the same. Abdomen black, tipped freely with yellow."

The above is Clemens' description.

The small tentiform mines of this species may be found on the underside of the leaves of *Ostrya Virginiana* (Mill.) Willd. They are usually between two veins and are less wrinkled than those of the other species, mining the same leaves, viz.: *L. ostryæfoliella.* The pupa is formed inside of a thin silken web which occupies an entire half of the mine. Expanse of the imago 6–6.5 mm.

I have some specimens in which the entire abdomen is pale grayish yellow, but which otherwise agree with Clemens' description.

Lithocolletis ostryæfoliella Clemens.

Plate XXI, Fig. 14.

Lithocolletis ostryæfoliella Clemens, Proc. Acad. Nat. Sci. Phil., 322, 1859.—Tin. No. Am., 64, 71, 1872.—Chambers, Can. Ent., iii, 85, 1871.—Cin. Quart. Jn. Sci., i, 202, 1874.—Can. Ent., xi, 91, 1879.—Walsingham, Ins. Life, ii, 53, 1889.—Busck, Proc. Ent. Soc. Wash., v, 188, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6275.

Syn. *mirifica* Frey and Boll, Stett. ent. Zeit., xxxiv, 212, 1873.

"Antennæ silvery. Front silvery, tuft fuscous and silvery mixed. Thorax silvery, with the basal part of the tegulæ pale golden. Forewings pale golden, with an unmargined, median, silvery basal stripe, and a silvery streak along the basal portion of the inner margin. Forewings pale golden, with four silvery costal streaks, all except the last black margined internally; with two dorsal streaks of the same hue, black margined internally. The first costal and first dorsal streaks opposite, quite oblique, and broad at their bases, the second dorsal opposite the second costal streak. The basal streak is moderately broad, and extends quite to the middle of the wing. Apical spot black; hinder marginal line blackish; cilia fulvous gray. Hindwings gray, cilia fulvous gray. Abdomen pale fulvous."

Clemens' description is given above.

The mines are formed on the underside of leaves of *Ostrya Virginiana* (Mill.) Willd., usually near the margin, and are much wrinkled when mature. The larvæ, which are of the cylindrical type and pale yellow, spin ovoid cocoons of frass and silk. Expanse of the imago 6–6.5 mm.

Lithocolletis rileyella Chambers.

Plate XXI, Fig. 15.

Lithocolletis rileyella Chambers, Cin. Quart. Jn. Sci., ii, 236, 1875.—Walsingham, Ins. Life, ii, 25, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6254.

Syn. *tenuistrigata* Frey and Boll, Stett. ent. Zeit., xxxvii, 225, 1876; xxxix, 260, 1878.

Antennæ ocherous-white, grayish toward the tips; face and palpi white, tuft ocherous.

Thorax and forewings golden yellow, the thorax with a white line across the patagia, continuous with a median white unmargined basal streak attaining one-third of the wing length. There are five costal and three or four dorsal white streaks, all dark margined internally. The first costal at the basal third is very oblique and produced along the costa to the base. The apex of the second oblique costal streak is opposite the apex of the large curved first dorsal streak. Third costal streak is nearly perpendicular, curved and opposite the large triangular second dorsal streak, placed just before the tornus. Fourth costal streak curved, with its apex meeting that of the smaller third dorsal streak. Fifth costal streak inwardly oblique and opposite the minute fourth dorsal streak, which is sometimes wanting. A small circular apical spot. A brownish marginal line in the cilia, which are pale whitish ocherous. Expanse 7–8 mm.

Hindwings and cilia pale whitish ocherous. Abdomen pale ocherous. Legs whitish ocherous.

Missouri and Texas.

This species makes a tentiform mine on the underside of several species of oak.

Lithocolletis kearfottella Braun.

Plate XXI, Fig. 16.

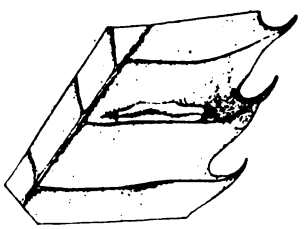
Lithocolletis kearfottella Braun, Ent. News, xix, 100. 1908.

Antennæ grayish, darker toward the tips. Palpi shining white, with a slight golden tinge. Face shining white, with a slight golden tinge; tuft reddish saffron, scales darker toward the tips.

Thorax and forewings shining reddish saffron. A white band extends across the anterior margin of the thorax, passes over the patagia and is continuous with a basal white streak. The basal streak extends for one-third the wing length, nearly parallel to the costa and is dark margined above. Four costal and three dorsal shining white streaks, all dark margined internally. The first costal streak at the basal third is placed very obliquely, and is produced along the costa to the basal fourth. The first dorsal streak at the basal fourth is very large and very oblique. Near the costa its apex sometimes unites with that of the first costal streak, forming a very acute angle. The remaining three costal streaks are placed at equal distances from each other and from the first costal streak. The second costal streak is almost perpendicular to the costa and wedge-shaped. Opposite to it on the dorsum, before the tornus, is the larger almost perpendicularly placed wedge-shaped second dorsal streak. The third costal streak is inwardly oblique, curved, its apex pointing toward the apex of the third dorsal streak, which is small, wedge-shaped and placed beyond the tornus. The fourth costal streak is very oblique and curved. A large black apical dot. A brown line in the cilia extending from the fourth costal streak around the apex to the third dorsal streak. Cilia grayish. Just below the fourth costal streak there is a darker brownish streak in the cilia, giving the appearance of a hook, as in *L. fitchella* Clem., but not as distinct. Alar expanse 7 mm.

Hindwings pale grayish, with a slight ocherous tinge. Cilia whitish gray, tinged with ocherous. Abdomen dark gray above, silvery white beneath. Anal tuft grayish ocherous. Legs silvery white slightly shaded with ocherous, tibiæ and tarsi of the first pair very dark brown.

Three specimens, Montclair, N. J., bred by Mr. W. D. Kearfott, from mines on chestnut collected in October, 1901. The imagoes appeared in the following spring.



Mine of *L. kearfottella*.

I have specimens from Powell Co., Kentucky, on chestnut; and there are a number of specimens in the Nat. Mus. collection bred by Mr. August Busck on chestnut at Washington, D. C.

The rather small elongate mine of this species is found upon the lower side of the leaf, where it is placed between two veins. The pupa is enclosed in a loose, semi-transparent silken cocoon.

Lithocolletis caryæalbella Chambers.

Plate XXI, Fig. 17.

Lithocolletis caryæalbella Chambers, Can. Ent., iii, 58, 85, 182, 206, 1871.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6261.

Syn. *caryalbella* Walsingham, Ins. Life, iii, 328, 1891.

"Head, palpi, tuft, antennæ and thorax silvery white; basal portion of the wing (within the costal and dorsal streaks) silvery white, with a wide pale golden basal streak along the costal margin from the base to the first costal streak. The basal white portion in some lights suffused with pale golded. Apical two-thirds or more of the wings pale golden, with four silvery costal and two dorsal silvery streaks, all dark margined internally. The first dorsal large, oblique, opposite the first costal, which is smaller; their dark margins uniting at an acute angle on the fold, the streaks themselves being scarcely confluent. Second dorsal opposite to and larger than the second costal; its dark margin wide. Third and fourth costal streaks small. Apical spot small, black; hinder marginal line at the base of the cilia brown. Cilia pale, fulvous. Alar expanse one-fourth inch. Larva unknown. Mines the under surface of the leaves of hickory trees (*Carya alba*). Mine ovoid, tent-like. The parenchyma is eaten off of the upper cuticle in a ring, leaving a green spot in the centre, which is then eaten off. The pupa is contained in an oval cocoon made of frass. Imago in July—rare."

The above, which is Chambers' description, is accurate in all details, except that, as shown by Chambers' types, the dark margins of the first pair of streaks do not unite, but are narrowly separated by the pale golden ground color of the wing. Kentucky and Wisconsin (Chambers).

Lithocolletis olivæformis sp. nov.

Plate XXI, Fig. 18.

Antennæ white, grayish toward the tips. Face, palpi, tuft and thorax pure snow-white.

Forewings pale brownish ocherous, with a median white basal streak dark margined toward the costa, and four costal and two dorsal white streaks, all dark margined internally. The dorsal margin is also whitish toward the base. The first dorsal streak placed somewhat nearer the base than the first costal, has its dark margin bent backward on the fold for a short distance, then continued obliquely upward. The second dorsal streak rather large and triangular, has its apex directed toward the space between the second and third costal streaks. A small black apical spot. A brown marginal line in the cilia, which are whitish ocherous. Alar expanse 6.5 mm.

Hindwings, cilia and abdomen pale grayish ocherous. Legs whitish ocherous, tarsi unspotted.

Type.—Female, No. 12008, U. S. N. M.

This species, bred from *Carya olivæformis* Nutt., is very distinct from *caryæalbella* Cham. The type at the National Museum bears the following labels: 811, *Carya oliv.* Pupa 6-VI.

This species may be distinguished by the irregular anterior margin of the first dorsal streak.

Lithocolletis martiella sp. nov.

Plate XXI, Fig. 19.

Antennæ brownish gray. Face and palpi yellowish white. Scales of the tuft pale brownish ocherous, darker toward the tips.

Thorax and forewings deep reddish saffron. A rather broad median white basal streak, ending at one-third the wing length, is faintly dark margined above and at its apex. Just before the middle of the wing is a curved white fascia margined on the inner side with brown scales and shading into the ground color on the outer side. Beyond this are three costal and two dorsal white streaks, margined internally with brown scales, the last costal and dorsal streaks but faintly so. The first dorsal streak, which begins opposite the wedge-shaped, perpendicular first costal streak, is oblique, its apex directed toward the apex of the second costal streak. Second dorsal streak above the tornus, points toward the second costal streak. In the apical portion of the wing, just below the third costal streak, is a conspicuous black apical dot. A dark brown marginal line in the cilia, which are pale grayish brown at the apex, becoming darker toward the tornus. Alar expanse 6.8 mm.

Hindwings and cilia brownish gray. Abdomen dark brownish gray. Legs pale brownish gray, tarsi unspotted.

Type.—Male, No. 12003, U. S. Nat. Mus.

A single specimen of this very distinct species was bred by Dr. Harrison G. Dyar at Kaslo, B. C. Record number 21563, the food plant being given with some doubt as birch, which is, however, probably correct, as the species bears a close relationship to the European birch feeding species, *ulmifoliella* Hb.

Lithocolletis gemmea Frey and Boll.

Plate XXI, Fig. 20.

Lithocolletis gemmea Frey and Boll, Stett. ent. Zeit., xxxiv, 218, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 206, 1874; ii, 227, 1875.—Can. Ent., xi, 144, 1879.—Walsingham, Ins. Life, ii, 53, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6266.

Antennæ dark gray, whitish at the apices. Face and palpi pale golden. Tuft dark brown mixed with white scales.

Thorax and forewings deep shining reddish saffron. A very narrow line across the patagia is continuous with a broader basal streak, which is white with a golden lustre. The basal streak, ending at one-third the wing length, is dark margined above and indistinctly so beneath. On the dorsal margin, just before the apex of the basal streak is a small broad white spot. Just before the middle of the wing, is a nearly straight fascia, distinctly margined on its inner side with black, and with a few scales on the outer side. Beyond the fascia are two pair of streaks, of which the two costal and the first dorsal are black margined internally. The first pair of streaks are large, triangular and placed nearly perpendicular, the dorsal just before the tornus with its apex between the first and second costal streaks. The second dorsal streak above the tornus is small and opposite the second costal streak. Beyond them, the apical portion of the wing is

densely dusted with brown scales, forming a large apical spot. Marginal line in the cilia brown. Cilia pale brownish gray. Expanse 7–7.5 mm.

Hindwings and cilia pale reddish brown. Abdomen and legs dark brown. Hind tarsi whitish, except the first two joints, which are brown tipped with white.

Massachusetts.

According to Frey and Boll, the food plant of this species is *Robinia Pseudacacia* L., the mine being on the upper side of the leaf.

Lithocolletis morrisella Fitch.

(Plate XXI, Fig. 21.)

Argyromiges morrisella Fitch, Rept. Ins. N. Y., v, 336, 1859.

Lithocolletis morrisella Chambers, Can. Ent., iii, 183, 1871.—Walsingham, Ins. Life, ii, 52, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6269.

Syn. *texanella* Zeller, Verh. Zool.-bot. Ges. Wien, xxv, 349, 1875.—Frey and Boll, Stett. ent. Zeit., xxxix, 275, 1878.—*amphicarpæella* Chambers, Bull. Geol. Surv. Terr., iii, 137, 1877.

Face and palpi whitish gray. Antennæ gray, annulate with dark brown. Tuft dark brown mixed with a few whitish scales.

Thorax and inner margin of the forewings beneath the fold dark brown, sometimes more golden beyond the fascia. Remainder of the wing golden brown, markings bright shining silvery. In the fold is a silvery basal streak, uniting with the upper side of a nearly perpendicular white dorsal streak at one-third. A little beyond this on the costal margin is a somewhat oblique streak dark margined on both sides. About the middle of the wing, is a slightly convex or obtusely angled fascia dark margined internally and, on its costal half, externally. Beyond this are two perpendicular costal streaks dark margined internally and the former also externally. Opposite to the first of these costal streaks is a dorsal streak whose apex sometimes meets that of the costal. In the fold between this streak and the fascia is a velvety black streak. Opposite the last costal streak, there is sometimes a small silvery dorsal streak. Apical spot black, varying in size, sometimes occupying the entire apex of the wing. Cilia gray, becoming darker toward the tornus; marginal line blackish. Expanse 6–7 mm.

Hindwings and cilia gray. Abdomen brownish gray above, somewhat metallic. Legs and tarsi gray, banded with white.

Eastern U. S., west to Colorado and Texas.

This species may be bred from whitish mines on the under side of *Falcata comosa* (L.) Kuntze (= *Amphicarpa monoica* L.).

The white basal streak, confluent with the first dorsal streak separates this species from both *robiniella* and *uhlerella*.

Lithocolletis uhlerella Fitch.

Plate XXI, Fig. 22.

Argyromiges uhlerella Fitch, Rept. Ins. N. Y., v, 337, 1859.

Lithocolletis uhlerella Chambers, Can. Ent., iii, 183, 1871.—Walsingham, Ins. Life, ii, 53, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6268.

Syn. *amorphæella* Chambers, Bull. Geol. Surv. Terr., iii, 132, 137, 1877.—*amorphæ* Frey and Boll, Stett. ent. Zeit., xxxix, 275, 1878.

Face and palpi whitish gray. Antennæ gray, annulate with dark brown, Tuft brownish.

Thorax and inner margin of the forewings beneath the fold dark brown, more golden behind. Ground color of the remainder of the wing golden brown. The first costal streak at the basal third is somewhat oblique and dark margined on both sides. A little nearer the base is the more perpendicularly placed first dorsal streak. About the middle of the wing is a curved or obtusely angulated white fascia, dark margined internally and toward the costa externally. Beyond this are two nearly perpendicular white costal streaks, dark margined internally, of which the former is opposite a white dorsal streak, just before the tornus. In the fold, between the fascia and this dorsal streak, is a black streak. A black apical spot sometimes elongate. Cilia grayish, with a blackish marginal line. Expanse 6-6.5 mm.

Hindwings and cilia brownish gray. Abdomen dark brownish gray. Legs gray, hind tarsi whitish toward their bases.

Eastern U. S., west to Colorado and Texas.

The whitish rather flat mine of this species occurs on the under side of leaves of *Amorpha fruticosa* L.

Uhlerella may be distinguished from *robiniella* by the presence of the first white dorsal streak, the complete median fascia, and the less oblique position of the streaks. It differs from *morrisella* by the absence of a white basal streak.

Lithocolletis robiniella Clemens.

Plate XXI, Fig. 23.

Lithocolletis robiniella Clemens, Proc. Acad. Nat. Sci. Phil., 318, 1859; 209, 1860.—Tin. No. Am., 66, 1872.—Chambers, Can. Ent., iii, 54, 87, 163, 183, 185, 1871; iv, 9, 107, 1872.—Cin. Quart. Jn. Sci., ii, 228, 1875.—Bull. Geol. Surv. Terr., iii, 137, 1877.—Jn. Cin. Soc. Nat. Hist., ii, 91, 1879.—Zeller, Verh. zool.-bot. Ges. Wien., xxv, 348, 1875.—Frey and Boll, Stett. ent. Zeit., xxxix, 275, 1878.—Busck, Proc. Ent. Soc. Wash., v, 189, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6267.

Syn. *pseudacaciella* Fitch, Rept. Ins. N. Y., v, 335, 1859.

Face and palpi silvery; antennæ and tuft dark brown, the latter mixed with gray. Thorax dark brown.

Forewings golden above the fold, dark gray dusted with black below the fold, this dark shade extended to the costa at the base, becoming more golden toward the tornus. Four rather large silvery costal streaks, the first two oblique. Opposite to the first of these, which is placed before the middle, and is dark margined on both sides, the position of a first dorsal streak is indicated by a somewhat lighter shade. The second at about the middle, also dark margined on both sides, nearly unites at an angle with an opposite white dorsal streak, dark margined internally. A white costal streak at three-quarters, margined internally with a curved black line, nearly unites with an opposite internally mar-

gined dorsal streak. A fourth white costal streak, just before the apex is also internally dark margined. Between the first and second dorsal streaks is a black streak in the fold. A third streak beyond the tornus is indicated by two or three white scales. Black apical spot round or wedge-shaped. Marginal line at the base of the cilia blackish. Cilia silvery at the apex, tipped with gray. Expanse 6-6.5 mm.

Hindwings and cilia dark gray. Abdomen dark gray. Legs gray.

The larvæ, which belong to the cylindrical group, form whitish mines upon either the upper or the underside of leaves of locust, *Robinia pseudacacia* L. A white silken cocoon is spun within the mine. This species occurs throughout the Atlantic States.

Lithocolletis auronitens Frey and Boll.

Plate XXI, Fig. 24.

Lithocolletis auronitens Frey and Boll, Stett. ent. Zeit., xxxiv, 216, 1873.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6302.

Head saffron brown, face lighter, antennæ light brown, annulate with darker, the apex whitish.

Thorax and forewings shining saffron, rather light, legs yellowish gray, unspotted; abdomen dark gray. The marks of the forewings have a strong metallic lustre, which is between the color of gold and silver. There are four pair of streaks. The first costal streak is at the basal fourth of the wing length and is obliquely placed. The first dorsal streak is shorter, and nearer the base than the costal streak. Almost in the middle of the wing, th re follow, placed one directly above the other, two more marks, which are tall narrow triangles, somewhat dark margined internally, whose apices touch each other. The third pair of markings at three-fourths of the wing length, are very similar to the preceding pair, except that the dorsal triangle lies nearer to the base than the costal triangle. The fourth pair of markings, just before the apex of the wing, consists of a small costal streak, which has inwardly a few dark scales, and a small dorsal streak, which is placed so far back that it is beyond the hind angle. In the apex is a black dot, toward the base overlaid with metallic scales. Cilia light; a dark curved line extends through them at the apex.

Hindwings and cilia gray.

On the underside the forewings are dark brownish gray; the marks reappear brownish white.

The larvæ live in fall toward the end of October on the underside of the leaves of *Alnus serrulata* Willd. The mine is roundish, the loosened epidermis is much wrinkled, resulting in the leaf being rather arched at this place. The imagoes appear in May and June.

The above is a translation of the original description.

The type specimens were bred by Boll in Massachusetts. In the U. S. Nat. Mus. is a specimen bred on alder, with no locality given.

There is a very indistinct short basal streak on the wings. The first costal streak is very long, oblique and curved, and dark mar-

gined on both sides; the corresponding dorsal streak is more properly called a spot, and is scarcely dark margined. The expanse is 6.5–8.2 mm.

Lithocolletis diaphanella Frey and Boll.

Plate XXII, Fig. 1.

Lithocolletis diaphanella Frey and Boll, Stett. ent. Zeit., xxxix, 265, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6277.

Head, face, palpi and tuft snow white. Antennæ white, faintly annulate with ochre-yellow; basal joint ochre-yellow. Tegulæ snow white, thorax pale golden yellow. Abdomen whitish gray; legs whitish, tarsi annulate with brown.

Forewings pale golden brown, marks white. There is a broad basal streak without any dark margining extending for more than two-fifths of the wing length. It begins rather broad, and ends in a long point directed toward the costa. Behind the middle of the wing there is a small, bent, very oblique costal streak, faintly blackish margined toward the base. There is a similarly bent but broader dorsal streak beginning nearer the base and pointing toward the first costal streak. On the costa follow very small, faintly inwardly dark margined streaks. A fourth one is indicated by a few white scales. At the hind angle is an inwardly blackish margined white dorsal triangle. It apex extends between the second and third costal streaks. From this, a line of blackish scales extends toward the termen. Cilia whitish, with a blackish basal line. The latter only extends around the apical part of the wing. [Expanse 6 mm.]

Hindwings light, yellowish gray, cilia whitish.

This species, the habitat of which is given as Texas, is an underside miner on scrub oak. A peculiar characteristic of the mine, as noted by Frey and Boll, is its transparent appearance, when mature, allowing the pupa to be plainly visible through the epidermis.

The description is a translation of the original.

There is a specimen of this species from Texas in the U. S. Nat. Mus.

Lithocolletis minutella Frey and Boll.

Lithocolletis minutella Frey and Boll, Stett. ent. Zeit., xxxix, 263, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6276.

Head and tuft pale golden brown, the latter mixed with white. Face and palpi whitish; antennæ whitish, obscurely annulate with brown.

Thorax pale golden brown, tegulæ bordered with whitish, abdomen gray, with a yellowish white tuft. Legs whitish, all the tarsi spotted with black.

The pale golden brown (approaching the color of *L. faginella*) faintly shining forewings have peculiar white markings. There is a short narrow basal streak dark margined toward the costa, ending just before the two-fifths of the wing length. The first costal streak beginning at two-fifths is placed very obliquely, is dark margined toward the base, sharply bent at an angle in the fold, and is then prolonged as a very short spur toward the dorsum and base. Beginning under the apex of the basal streak, and extending toward the costal streak, is a

rather small and bent dorsal streak, also placed very obliquely. It does not attain the fold, and ends at some distance from the short spur of the costal streak. In the apical half of the wing there are three more small costal streaks, dark margined toward the base. On the dorsum there is a considerable sized streak of the shape of an equilateral triangle, whose apex, covered with black scales, projects between the second and third costal streaks. There are a few white scales in the apical portion of the wing. The cilia at the apex of the wing are shining and of the wing color, with a blackish basal line. Toward the hind angle they become yellowish gray.

Hindwings light gray. Cilia lighter. The underside of the forewing is brownish gray.

The mines, which produced the specimens, from which Frey and Boll described the species, were found by Boll in eastern Texas on the underside of leaves of *Quercus rubra* L. They are roundish, small and slightly wrinkled.

No exact expanse is given, but the statement is made that the species is small.

Lithocolletis scudderella Frey and Boll.

Plate XXII, Fig. 2.

Lithocolletis scudderella Frey and Boll, Stett. ent. Zeit., xxxiv, 212, 1873.—Chambers, Cin. Quart. Jn. Sci., ii, 230, 1875.—Bull. Geol. Surv. Terr., iv, 156, 1878.—Can. Ent., xi, 72, 1879; vii, 126, 1875.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6278.

Of medium size; however, several specimens are considerably smaller; rather broad-winged. The ground color of the head, thorax and forewings is a peculiar light yellowish brown. This color is similar to that of a flown specimen of *L. connexella* Z. The forewings are finely scaled. Head and palpi brownish white. Antennæ brownish white, annulate with darker. The legs are brownish white, the tibiæ of the first pair are striped with black. Thorax concolorous with the wings, with a median whitish line. Patagia whitish. Abdomen gray, lighter at the tip.

The markings of the forewings are somewhat indistinct, but are characteristic because of the great accumulation of black scales in the region of the fold. They are as follows: there is a rather straight basal streak ending at one-third the wing length, where it is slightly dilated. It is margined with blackish around the apex. The first pair of streaks are placed very obliquely. Of these, the costal is the smaller and is triangular. The dorsal is of very peculiar form, in that it is strongly constricted on the fold. Both are black margined internally. Usually the extent of the black scales on the inner edge of the dorsal streak is so greatly increased as to form a considerable sized black spot, which extends to the apex of the basal streak. (Less frequently these black scales are almost lacking). The next pair of streaks are at the middle of the wing length, and are also inwardly black margined. (These black scales are also increased so as to form a spot.) The costal streak is narrow, almost perpendicular; the dorsal forms a broader triangle, placed just before the tornus. Toward the apex are

two very narrow, slightly curved streaks. At the apex is a black dot or a streak, bordered with white scales toward the base. Cilia light, darker toward the tornus, with a blackish marginal line around the apex.

Hindwings dark gray. Cilia somewhat lighter.

The last three light costal streaks are visible on the dark brownish underside of the forewings.

The larvæ are abundant in October and November on several species of *Salix*. The mine is on the underside between the veins. It is elongate-oval and somewhat wrinkled. The imagoes emerged in April and May.

The above is a translation of Frey's description of *L. scudderella*. The second costal streak is placed rather beyond the middle than at the middle. In some specimens, there is also a third dorsal streak above the tornus. The apical black marking, when a streak, is often margined not only before with white scales, but also above for its whole length. Alar expanse 7.5–9 mm.

I have flown specimens taken at Cincinnati, Ohio, which are of a lighter and more grayish color than specimens bred by Mr. W. D. Kearfott on willow, Essex County Park, N. J.

Lithocolletis ledella Walsingham.

Plate XXII, Fig. 3.

Lithocolletis ledella Walsingham, Insect Life, ii, 79, 1889,—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6292.

"Antennæ whitish, faintly barred above with brown. Palpi white. Face white, frontal tuft saffron, mixed with whitish. Thorax golden saffron, with a few white scales.

"Forewings golden saffron with a white medio-basal streak, somewhat expanding outwards on the fold and reaching to one-third the length of the wing above it, this is dark margined on its upper edge; beyond it are four costal and four dorsal silvery white streaks; the first dorsal commences beneath the point of the basal streak and extends obliquely outward to the middle of the wing, it is dark margined internally and around its apex; the costal streak above it is short, rather square, and also internally dark margined; the second costal streak scarcely longer than the first, is a little oblique and also inwardly dark margined; beyond this are two more narrow costal streaks, the first curved outwards, and dark margined internally, the second pointing inwards from above the apex, with a few black scales at the extremity; the second dorsal streak is triangular, dark margined internally and around the apex, commencing somewhat further from the base than the second costal streak, its point lies between the second and third; the last two of the four dorsal streaks are very slender, and pointing inward, with a few black scales at their ends, where they reach the points of the costal streaks above them; a black elongate spot lies at the apex, separated from the dark apical line which lies at the base of the golden gray apical cilia.

"Hindwings and cilia gray, with a faint golden sheen. Abdomen gray, and tuft paler. Hind tarsi whitish gray, unspotted. Alar expanse, 9–10 mm."

"Six specimens, bred from somewhat folded mines, occupying the whole upperside of leaves of *Ledum glandulosum*, found in June in Mendocino County, Cal., and bred the same month. I met with this species also on the wing at the same time and place. It appears to be nearly allied to *salicicolella* Sircom, among the European species."

The above is Lord Walsingham's description.

Lithocolletis salicivorella Braun.

Plate XXII, Fig. 4.

Lithocolletis salicivorella Braun, Ent. News, xix, 101, 1908.

Antennæ pale grayish ocherous, faintly annulate with darker, somewhat darker at the tip. Palpi shining white. Face white. Tuft pale gray, with an ocherous tinge.

Thorax and basal third of the forewings ocherous gray. Wings becoming more ocherous towards the apex. A white band across the anterior margin of the thorax extends across the patagia and is continuous with a median basal white streak on the forewings. There is a short dorso-basal white streak somewhat dilated posteriorly. The median basal streak is curved downward and extends for two-fifths of the wing length where it is confluent with the first dorsal streak, its upper edge uniting with the apex of the first dorsal streak. A few dark brown scales extend around the apex of the angle thus formed. There are four costal and three dorsal white streaks. The first dorsal streak at the basal fourth is very large, oblique and curved. Internally it is dark margined just before it unites with the basal streak, the dark margin being continued around the angle and for a short distance along the lower side of the basal streak. The extreme edge of the costa is dark brown for about one-third of the wing length, where the dark line is deflexed and continues as the dark margining of the first costal streak, which is narrow, very oblique, its apex extending to a point just beyond the apex of the first dorsal. The second costal streak is large, nearly perpendicular, its apex opposite to that of the second dorsal streak, which is also very large, and placed slightly nearer the base than the corresponding costal streak, and is somewhat oblique. The next pair of streaks, of which the dorsal is placed just above the tornus, are nearly opposite to each other, slightly oblique toward the base and curved; their apices nearly meet. These two pair of streaks are margined internally with brown scales. Fourth costal streak oblique, curved and unmargined. A narrow line of black scales extends from below the apex of the last costal streak to near the apex of the wing, and is margined above by a line of white scales. Marginal line in the cilia dark brown, extending around the apex from the fourth costal streak to the third dorsal. Cilia grayish ocherous. Alar expanse 7 mm.

Hindwings grayish. Cilia gray, with a fulvous tinge.

Abdomen dark gray above, whitish beneath. Anal tuft grayish ocherous. Legs whitish, banded and striped with gray.

The unique type, a male, of this species was bred by Mr. W. D.

Kearfott from a much wrinkled mine on the underside of a willow leaf, collected in Essex County Park, New Jersey, July 6, 1902. The imago appeared July 19th.

Lithocolletis deceptusella Chambers.

Plate XXII, Fig. 5.

Lithocolletis deceptusella Chambers, Can. Ent., xi, 73, 1879.—Walsingham, Ins. Life, iii, 328, 1891.—Busck, Proc. Ent. Soc. Wash., v, 190, 1903.

Face, palpi and antennæ white; antennæ faintly annulate with brownish. Tuft pale brownish ocherous, mixed with white.

Thorax and forewings pale golden brown. Three longitudinal white streaks on the thorax, the median one continuous with a short narrow dorso-basal white streak, the other two uniting with the unmargined median basal streak, which curves downwards and unites with the upper edge of the slightly oblique nearly square first dorsal streak, which is faintly margined internally by a darker shade. The first costal streak, a little beyond it, is triangular, somewhat oblique, and dark margined on both sides. Second costal streak nearly perpendicular and opposite the larger triangular second dorsal streak, both faintly dark margined before. Last two costal streaks small, oblique and faintly internally margined. A third dorsal streak above the tornus is indicated by its dark margin. Beginning under the apex of the third costal streak is a dark brown streak of scales, extending to the apex. A brown marginal line extends around the apex, at the base of the cilia, which are pale whitish ocherous. Expanse 6 mm.

Hindwings and cilia pale grayish, slightly fulvous. Forelegs pale, tibiæ and first tarsal joint reddish.

Kentucky (Chambers).

This species has been made a synonym of *blancardella* (Walsingham, Trans. Am. Ent. Soc., x, 202, 1882). An examination of Chambers' type shows it to be a distinct species, not closely related to *cratægella* or the other apple feeding species. It differs from *cratægella* in the less oblique first costal streak; in the confluence of the unmargined basal streak with the first dorsal streak, which is entirely different from the first dorsal streak of *cratægella;* and in the absence of any very distinct dark margining of the streaks.

Lithocolletis alnicolella Walsingham.

Plate XXII, Fig. 6.

Lithocolletis alnicolella Walsingham, Ins. Life, ii, 80, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6273.

"Antennæ whitish, very faintly spotted above. Palpi white. Face white, frontal tuft grayish saffron. Thorax pale grayish saffron, touched with white at the sides.

"Forewings pale grayish saffron with three dorsal and four costal silvery white streaks, all dark margined on their inner sides and at their points; a somewhat broad but very indistinct white medio-basal streak extends above the fold

to one-third the wing length, and a shorter streak of the same color follows the dorsal margin from the base to half the length of the one above it; the first dorsal streak is broad, outwardly oblique, and reaching nearly to the smaller triangular costal streak above it; in some specimens it actually attains to it, forming an angulated fascia; the point of the second dorsal, also somewhat triangular, is directed a little beyond the point of the second costal streak above it; these are both nearly perpendicular; the third dorsal very small; arising opposite the space between the third and fourth costal streaks; it reaches to the apex of the former; the end of the wing is enclosed by a dark semi-circular line at the base of the cilia, within which is an elongate blackish spot; cilia are grayish, with a faint saffron tinge.

"Hindwings and cilia pale grayish. Abdomen gray above, anal tuft scarcely paler. Posterior tibiæ, whitish, unspotted. Expanse 6 mm."

"Two specimens were bred from larvæ found mining the upper sides of leaves of *Alnus incana* on Mount Shasta, Siskiyou County, Cal., in August, 1871, in which month the perfect insects emerged. Three other specimens were met with on the wing, also in the neighborhood of Mount Shasta."

The above is Lord Walsingham's description.

Lithocolletis alni Walsingham.

Lithocolletis alni Walsingham, Ins. Life, iii, 326, 1891.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6274.

Syn. *alnivorella* Chambers (not Ragonot), Cin. Quart. Jn. Sci., ii, 302, 1875.—Bull. Geol. Surv. Terr., iii, 139, 1877.

"Palpi and antennæ rather short for this genus, and tuft on the vertex also small; face, palpi, under surface of the thorax and abdomen and the legs silvery, the palpi a little darker on the outer surface; antennæ and tuft silvery fuscous, or perhaps as correctly ash-brown; upper surface of thorax and forewings egg-yellow, varying to golden with change of light. There is a short basal, silvery white streak along the dorsal margin of the forewings, and a longer median basal streak of the same color, and dark margined toward the costa. A silvery white fascia immediately before the middle, posteriorly obtusely angulated about the middle of the wing, and dark margined before, the dark margin becoming more diffuse along the dorsal margin, where it is produced forwards until it meets the basal dorsal white streak; the point of the angle of the fascia is sometimes margined behind by a small dark brown spot, and the fascia is widest on the dorsal margin; just behind the middle is a costal silvery white streak, and opposite to it is a dorsal one, both strongly dark margined before, and both pointing a little obliquely backwards, this dorsal streak is placed immediately before the cilia, and a little further back is a small triangular dorsal silvery spot, dark margined before; opposite to the space between these two is a straight silvery costal streak, also dark margined before, which sometimes bends backwards and unites with the second of the dorsal streaks referred to above; whilst its dark margin bends forwards and unites with the dark margin of the first one; further back is a third costal streak, which is small, straight and dark margined before.

Apical spot triangular and dark brown; cilia silvery fuscous; hindwings and cilia a little darker than the cilia of the forewings. Abdomen shining bluish black on its upper surface. Alar expanse less than one-third inch. Spanish Bar. The larva is cylindrical, and makes a large tentiform mine on the under surface of the leaves of an *Alnus*."

The above is Chambers' description. This species is apparently close to *alnicolella* Wlsm., the principal difference being in the larval habits, as noted by Lord Walsingham, under his description of *alnicolella*. I have seen no specimen and no type is in existence.

Lithocolletis malimalifoliella Braun.

Plate XXII, Fig. 7.

Lithocolletis malimalifoliella Braun, Ent. News, xix, 101, 1908.

Antennæ gray. Palpi silvery white. Face silvery white. Tuft golden brown, tipped with dark brown.

Thorax and forewings golden brown. There are three longitudinal stripes on the thorax, one median, the other two passing over the patagia and continuous with a median white basal streak, ending at one-third the wing length and dark margined above and around the tip behind. The dorsal margin is also white for a short distance. There are three costal and two dorsal white streaks of which the dorsal are the larger, all dark margined before, and the first pair dark margined at the tip behind. The first costal at the basal third is small, oblique. The first dorsal at the basal fourth is very large, oblique and curved, ending just before the apex of the first costal. The second costal streak is small, nearly perpendicular, and opposite the second dorsal, which is triangular, and placed just before the tornus. The third costal streak, at the same distance from the second as the latter is from the first, is somewhat oblique, pointing forward. A third dorsal streak is indicated by the dark margin. An elongate black apical spot, with a few scattered brown scales before it. Marginal line in the cilia blackish with a distinct blue lustre around the apex. Cilia gray, brownish around the apex. Alar expanse 5.5-6 mm.

Hindwings dark gray. Cilia gray. Abdomen very dark gray above, silvery white beneath. Legs gray, hind tarsi blackish, grayish at their bases.

I have bred this species from small tentiform mines on the underside of leaves of apple, *Malus Malus* (L.) Britton. The appearance of the mine is entirely different from that of *L. cratægella* Clem. The mine is much wrinkled, and the leaf is strongly folded. The parenchyma is eaten in spots, giving the leaf a speckled appearance on the upperside. The pupa is suspended in a few silken threads. I also have flown specimens from Montclair, N. J., which are identical with the bred specimens.

There are two specimens of this species in the Museum of Comparative Zoology at Cambridge, Mass., bred by Chambers on quince, in Kentucky.

The mine also occurs on *Cratægus mollis* Scheele, and then the parenchyma is almost completely consumed.

Occasionally, specimens of *cratægella* occur in which the fourth costal streak is wanting, but *malimalifoliella* may be distinguished from these by the relative position of the third costal streak, which is placed farther back, almost equally dividing the space between the second costal and the apex.

Lithocolletis cratægella Clemens.

Plate XXII, Fig. 8.

Lithocolletis cratægella Clemens, Proc. Acad. Nat. Sci. Phil., 324, 1859; 208, 1860.—Tin. No. Am., 76, 141, 1872.—Chambers, Can. Ent., iii, 55, 108, 1871; v, 50, 1873; xi, 73, 1879.—Bull. Geol. Surv. Terr., iv, 100, 1878.—Walsingham, Trans. Am. Ent. Soc., x, 202, 1882.—Busck, Proc. Ent. Soc. Wash., v, 190, 1903.

Antennæ dark silvery gray. Face and palpi silvery. Tuft dark brown, mixed with whitish scales.

Thorax and forewings brownish golden, with a silvery basal streak continuous with a white line on each side of the thorax and extending for two-fifths of the wing length, black margined toward the costa and around its pointed apex. Dorsal margin narrowly white toward the base. Four costal and two or three white dorsal streaks, of which the first costal and the first two dorsal streaks are dark margined on both sides, the others internally only. The first costal streak, beginning at two-fifths, is oblique and rounded beneath, its internal margin produced along the costa to the base. The other three costal streaks are nearly perpendicular. The first dorsal streak, somewhat nearer the base than the first costal streak, also oblique, its apex a little beyond that of the first costal streak, which it also touches. Second dorsal streak triangular, just before the tornus and opposite the second costal streak. From the space between the second pair of streaks, a streak of dark scales extends to the apex. Marginal line in cilia blackish, with a decided bluish lustre. Cilia grayish ocherous. Expanse 6.5-7 mm.

Hindwings and cilia gray. Abdomen dark gray above, silvery beneath, with more ocherous anal tuft. Legs grayish, hind tarsi spotted with fuscous above.

An underside miner on several related plants, viz.: *Cratægus* sp., apple, and wild cherry, *Prunus serotina* Ehrh. The mine is rather small, usually lying between two veins. A common species in the eastern United States.

This species is distinct from any of the apple feeding species of Europe. It has been made a synonym of *L. blancardella* Fab., from which it differs in the much smaller size, more pointed basal streak, and less oblique first pair of streaks.

Lithocolletis propinquinella sp. nov.

Plate XXII, Fig. 9.

Antennæ dark gray. Face and palpi silvery. Tuft dark brown mixed with whitish scales.

Thorax brownish golden, with a white line across the anterior margin, passing over the patagia and continuous with the basal streak on the forewings. Forewings brownish golden in the male and darkened with brownish scales along the middle and in the dorsal half; more golden in the female. The rather broad basal streak, pointed at the apex, ends at about two-fifths of the wing length and is black margined above and around its apex. Dorsal margin narrowly white toward the base. Four costal and three dorsal white streaks. First costal just before the middle, very oblique, and dark margined internally and around its tip behind. The other three costal streaks nearly perpendicular and dark margined internally only. First dorsal streak commencing much nearer the base than the first costal, long and oblique, its apex reaching beyond that of the first costal, sometimes almost to the space between the second costal and dorsal streaks. It is dark margined on both sides. In the male its internal dark margin is indented on the fold, in the female it is almost regularly inwardly convex. An accumulation of blackish brown scales, densest in the male, between the second pair of streaks extends backward along the middle of the wing to the apex. Marginal line in the cilia blackish, with a bluish metallic luster. Cilia grayish ocherous, less gray in the female. Expanse 8-9 mm.

Hindwings and cilia grayish, with a fulvous tinge. Abdomen dark gray above, silvery beneath. Anal tuft grayish in the male, ocherous in the female. Legs grayish ocherous, tarsi gray above.

A common underside miner on wild cherry, *Prunus serotina* Ehrh.

A much more common species than *L. cratægella* Clemens, and more closely related to the European *blancardella*, from which, however, it is distinct. It differs from *cratægella* in the much larger size and the more oblique first dorsal streak, which is also relatively much nearer the base of the wing than in *cratægella*.

Lithocolletis incanella Walsingham.

Plate XXII, Fig. 10.

Lithocolletis incanella Walsingham, Ins. Life, ii, 81, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6272.

"Antennæ whitish, faintly spotted above. Palpi shining white. Face shining white, frontal tuft white, with a few saffron scales at the sides. Thorax bright reddish saffron, with a thin whitish line running around its anterior margin and communicating with the basal streak on the forewing.

"Forewings bright brownish saffron, with a long slender medio-basal white streak without dark margins, four costal and three dorsal streaks of the same color, sometimes with a slight metallic sheen; the first costal streak is a little before the middle of the wing, oblique and pointed, with a scarcely perceptible dark dusting along its inner margin; the first dorsal streak commences a little nearer to the base; it is dark margined internally, and is somewhat wider than

and reaches a little beyond the costal streak beyond it; the second costal streak is small and points slightly outwards; the third is nearly perpendicular; the fourth points slightly inwards from a little before the apex; these three are all dark margined on their inner edge; opposite to these are the second and third dorsal streaks; the second is triangular, wider at the base and dark margined internally, its black dusting communicating with a patch of similar blackish scales at its apex, extending to the second costal streak above it; the third dorsal streak is short, pointing inwards and dark margined on both sides, its outer margin being continuous with a dark line at the base of the cilia, which encircles the tip of the wing, reaching to the exterior costal streak; within this line, but separate from it, is an elongate apical spot of somewhat disconnected blackish scales, the cilia pale grayish.

"Hindwings and cilia pale grayish. Abdomen dark gray above, anal tuft somewhat paler. Hind tarsi white, tipped with grayish and two grayish saffron spots above. Expanse 9 mm."

"The larva feeds in mines on the underside of *Alnus incana* toward the end of June in Colusia County, Cal., the perfect insects emerged in July, 1871. Seven specimens were bred, and the species was also met with on the wing at Burney Creek (near Pit River), Shasta County, Cal."

The above is Lord Walsingham's description.

The mines also occur upon the upperside of the leaf. I have bred a large series of specimens on a species of *Alnus* from Alameda County, Cal., where the mines are very common on the upperside of the leaf, but appear very rarely on the lower side. Some specimens have the basal streak faintly margined above, especially toward the apex.

Lithocolletis populiella Chambers.

Plate XXII, Fig. 11.

Lithocolletis populiella Chambers, Bull. Geol. Surv. Terr., iv, 101, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6331.

"Palpi, head, tuft, antennæ, under surface of the thorax, legs, and abdomen pure snowy white; upper surface of abdomen and forewings pale golden; there are three white longitudinal streaks on the thorax (one median, and continuous with a dorso-basal white streak on the wings, the other two passing over the tegulæ, and continuous with a median basal white streak on the wings); there is also a costo-basal white streak on the forewings, and these three basal wing streaks are of about equal length, and less than one-fourth of the length of the wings. Immediately behind the dorso-basal streak, and scarcely distinct from it (probably sometimes confluent with it), is the first dorsal streak, which approaches a square form, and is dark margined before and above. Almost opposite to this dorsal streak, but a little behind it, is the first costal streak; it is oblique, not pointed, and is dark margined before. The second costal and second

dorsal are opposite each other, the costal one being the largest of the two, triangular and dark margined before. The third costal and third dorsal are nearly opposite, the costal being perhaps a little farther back, and being larger than the dorsal, and larger also than the second costal; both are dark margined before. These are the only three dorsal streaks. The fourth costal is just before the apex, points a little obliquely forward, and is margined behind by a small apical patch of brown dusting. Cilia white, with a brownish hinder marginal line at their base. Alar expansion one-fourth of an inch. Ohio and Kentucky."

The above is Chambers' original description. The second and third costal streaks can scarcely be said to be larger than their corresponding dorsal streaks; usually they are about the same size. There is also some variation in the amount of apical brown dusting; sometimes it only consists of two or three scales. The expanse is 6–7 mm.

I have bred this species from tentiform mines on the underside of the leaves of the silver-leaf poplar, *Populus alba* L., the same food plant from which Chambers bred this species. The mines are exceedingly small, oval, 9–10 mm. long, and 4–5 mm. broad; an indistinct fold extends through the long axis. They are scarcely visible on the lower side, owing to the peculiar tomentose texture of the leaf, and on the upperside may be distinguished by the speckled appearance of the leaf, caused by the larva eating the parenchyma in spots. The pupa is not enclosed in a cocoon, but its anal end is attached to a small button of silk toward one end of the roof of the mine.

Lithocolletis sexnotella Chambers.

Plate XXII, Fig. 12.

Lithocolletis sexnotella Chambers, Jn. Cin. Soc. Nat. Hist., ii, 189, 1879.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6282.

Face and palpi white; antennæ whitish, darker at the tips; tuft very pale golden.

Thorax and forewings very pale golden. Four costal and three dorsal white streaks (the third dorsal obscure and sometimes wanting); of these the first two pair are dark margined internally, the first dorsal also faintly around the tip. First costal very oblique, small and opposite the large curved first dorsal. Second dorsal opposite the space between the second and third costal streaks. A small dark brown apical spot. Marginal line at the base of the cilia brownish, with a pale blue metallic luster. Cilia whitish, slightly tinged with golden. Alar expanse 7–7.5 mm.

Hindwings and cilia pale yellowish. Abdomen above ocherous in the female, gray in the male, beneath whitish. Legs yellowish white, tarsi unspotted.

This species was described by Chambers from a Kentucky specimen, and the type is deposited in the Museum of Comparative

Zoology, Cambridge, Mass. A number of specimens collected by Mr. W. D. Kearfott, in Pike County, Penna., are identical with the type.

While very closely allied to *æriferella* Clem., *sexnotella* may be distinguished by its paler color, the pure white dorsal and costal streaks, and by having its second dorsal streak opposite the space between the second and third costal streaks. The internal margins of the corresponding costal and dorsal streaks never unite in the middle of the wing.

Lithocolletis æriferella Clemens.

Plate XXII, Fig. 13.

Lithocolletis æriferella Clemens, Proc. Acad. Nat. Sci. Phil., 320, 1859.—Tin. No. Am., 64, 68, 1872.—Chambers, Can. Ent., iii, 183, 1871.—Cin. Quart. Jn. Sci., ii, 104, 1875.—Busck, Proc. Ent. Soc. Wash., v, 187, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6281.

"Antennæ dark brown above, white beneath. Front silvery white; tuft dark brown. Forewings pale reddish saffron, with a golden hue, especially from the middle to the base, with four silvery costal streaks, the first on the middle of the costa, and all, except the last, black margined toward the base, the third but faintly, and the costa black from the base to the first costal streak. Three silvery dorsal streaks on the inner margin, the first two large and the third small, the first black margined internally and around the tip behind, the second by a line curved above. Apical spot small and black, with the scales behind it having a bluish splendent lustre; hinder marginal line blackish; cilia dark grayish, with a fulvous hue. Hindwings dark gray, cilia fulvous.

"The larva may be found in the leaves of oaks in September and early in October. It makes a small mine on the under surface, and the leaf is thrown into a fold previously to pupation and the cuticles folded and corrugated. The pupa is contained in an ovoid cocoon, within the mine, composed of "frass" and silk. The imago appears in May. The body of the larva is cylindrical. The head is pale brown; the body yellow, with a broad, vascular, reddish brown band."

The above is Clemens' description.

The white color of the costal and dorsal streaks, especially the first pair, is often suffused with pale golden. The margins of the second and the third costal streaks, in the middle of the wing, where they are of a dull leaden color, unite with the margins of their opposite dorsal streaks. In some of my specimens bred at Cincinnati from mines on *Quercus imbricaria* Michx., the dark margin of the second dorsal streak is very heavy and conspicuous.

Expanse 7–8.5 mm.

Lithocolletis obsoleta Frey and Boll.

Plate XXII, Fig. 14.

Lithocolletis obsoleta Frey and Boll, Stett. ent Zeit., xxxiv, 211, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 202, 1874.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6279.

Syn. *obsoletella* Chambers, Bull. Geol. Surv. Terr., iv, 155, 1878.

Antennæ whitish ocherous. Face and palpi white. Tuft whitish in the center, brownish toward the sides.

Thorax and forewings ocherous. There are four costal and two dorsal streaks, faintly indicated by a lighter shade. In some of the type specimens these streaks are almost obsolete, the wing then being nearly unicolorous. The first pair of streaks just before the middle are very oblique, the dorsal being the larger. The triangular second dorsal streak is opposite the space between the second and third costal streaks. In the apical part of the wing is an indistinct brownish spot, sometimes wanting. An indistinct brownish line in the cilia has a faint bluish lustre around the apex. Cilia whitish ocherous, darker toward the tornus. Expanse 8 mm.

Hindwings grayish ocherous, with slightly paler cilia. Abdomen in male grayish, in female pale ochreous. Legs whitish ocherous, tarsi not at all or but faintly spotted.

Hab.—Massachusetts, the locality from which the type specimens were obtained. Easily distinguished from all other species by the absence of any clearly defined markings.

Lithocolletis argentinotella Clemens.

Plate XXII, Fig. 15.

Lithocolletis argentinotella Clemens, Proc. Acad. Nat. Sci. Phil., 321, 1859.—Tin. No. Am. 66, 78, 1872.—Chambers, Can. Ent., iii, 148, 1871; xi, 89, 1879.—Frey and Boll, Stett. ent. Zeit., xxxiv, 213, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 202, 1874; ii, 101, 1875.—Busck, Proc. Ent. Soc. Wash., v, 190, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6283.

"Antennæ silvery. Front and tuft silvery. Thorax pale reddish saffron, with a rather short, unmargined, silvery basal streak, with five costal and four dorsal streaks of the same hue. The first costal and dorsal streaks unmargined, the first dorsal being near the inner angle of the base, tapering to a point in the middle of the wing from a very broad base; the first costal streak rather slender, and only one-half as long as the first dorsal; the second costal and second dorsal connected about the middle of the wing, and dark margined toward the base by a line much curved in the middle; the third costal and third dorsal opposite, and each dark margined internally; the fourth dorsal about midway between the fourth and fifth costal streaks; sometimes the fourth costal and dorsal streaks with a few dark internal scales, sometimes unmargined. At the apex is a small patch of scattered black scales; the hinder marginal line rather indistinct; cilia saffron, paler on inner margin. Hindwings shining silver-gray, cilia rather darker."

The above is Clemens' description.

A white transverse band across the anterior margin of the thorax, crossing the patagia, continuous with the basal streak, is not mentioned in the description. The tuft is golden at the apex. Abdomen yellowish fuscous above; anal tuft yellow. Legs whitish, spotted with brown. Alar expanse 6.5–8 mm.

Bred from underside mines on elm, *Ulmus fulva* Michx. and *Ulmus Americana* L. The pupa is formed within a transparent silken web, occupying half the mine.

Lithocolletis occitanica Frey and Boll.

Lithocolletis occitanica Frey and Boll, Stett. ent. Zeit., xxxvii, 224, 1876; xxxix, 270, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6284.

Face and palpi white; tuft white, with a few brownish scales; antennæ whitish, faintly annulate with yellowish; legs whitish, spotted with brown. Abdomen gray.

The thorax (with a white line across the patagia) and the forewings are deep saffron. They are lustreless, and their markings are pure white. At the base of the wings in the fold there is a very short white streak. At the basal fifth there begins on the dorsal margin a broad, backwardly bent, oblique cross streak, whose pointed apex does not reach the costal margin. At the middle of the wing length there is a narrow, slightly horse-shoe shaped complete fascia, inwardly narrowly dark margined. A third similarly formed fascia appears at three-quarters of the wing length. Each of these is darkened or interrupted in its costal half, as in the middle by a group of brown scales. In the apical part of the wing there are some more scattered brownish scales. The cilia around the apex are saffron gray, around the hind angle entirely light yellowish gray.

The hindwings and cilia are whitish.

According to Frey and Boll, whose description is given above, this species may be bred from an underside rather arched mine on *Ulmus fulva* Michx.

Hab.—Texas.

I have had no opportunity of examining specimens of this species. Further study and breeding of a large series may show that it is not specifically distinct from *argentinotella* Clem.

Lithocolletis apicinigrella sp. nov.

Plate XXII, Fig. 16; Plate XXIV, Fig. 23.

Antennæ pale grayish ocherous. Face and palpi whitish. Tuft grayish ocherous, mixed with brown and white scales.

Thorax and forewings pale grayish ocherous. Markings ocherous white and usually very indistinct and ill-defined. When distinct, they consist of a pale unmargined basal streak extending for one-fourth the wing length in the fold, then bent upward toward the costa; a dorso-basal streak continuous with a median line on the thorax and uniting with the first dorsal streak; just before the

middle an oblique costal and a dorsal streak, faintly or not at all dark margined internally, which sometimes unite to form an angulated fascia; three more nearly perpendicular costal streaks; a dorsal streak before the tornus, oblique and pointing toward the third costal streak; sometimes two more dorsal streaks above the tornus, which unite with the third and fourth costal streaks respectively, thus enclosing the apex, which then contains a small patch of blackish scales. Usually, the last two dorsal streaks are wanting, and the black scales are so increased as to occupy the entire apex, a line of them extending to the tornus. Often all of the marks are very ill-defined and the entire thorax and dorsal portion of the wing below the fold is of the pale color, and the black area at the apex is very pronounced. Alar expanse 6.5-7.5 mm.

Hindwings and cilia pale grayish ocherous. Abdomen pale gray, with silvery anal tuft. Legs pale silvery ocherous.

Described from a series of specimens bred from mines on the underside of leaves of a species of *Salix*, received from Mr. G. R. Pilate, Mills College, Alameda Co., Cal., and from two captured specimens in the U. S. Nat. Mus., from Seattle, Wash. (Prof. T. Kincaid, collector).

Lithocolletis basistrigella Clemens.

Plate XXII, Fig. 17.

Lithocolletis basistrigella Clemens, Proc. Acad. Nat. Sci. Phil., 321, 1859.—Tin. No. Am., 39, 65, 69, 1872.—Chambers, Can. Ent., iii, 148, 166, 182, 1871.—Cin. Quart. Jn. Sci., i, 205, 1874.—Walsingham, Insect Life, ii, 25, 1889.—Busck, Proc. Ent. Soc. Wash., v, 188, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6301.

Syn. *intermedia* Frey and Boll, Stett. ent. Zeit., xxxiv. 210, 1873.—Chambers, Cin. Quart. Jn. Sci., ii, 230, 1875.

"Antennæ silvery. Front silvery, tuft fulvous, mixed with silvery. Thorax pale, reddish golden, with a white streak on each side, and one in the middle. Forewings shining ocherous saffron, with a slender unmargined white basal streak in the fold, a white basal streak along the costa, narrowly dark margined on the extreme costa, extended to the first costal streak, which is silvery white, very oblique and unmargined; behind this are three small costal streaks of the same hue, the two central dark margined internally. Opposite the first costal streak is a long, very oblique, silvery white dorsal streak, extending along the inner margin to the base, with dark brown scales between their hinder ends, or exterior to the tip of the dorsal streak, but sometimes absent. Nearly opposite the third costal streak is a dorsal silvery streak dark margined internally. No apical spot, sometimes with dispersed brown scales beneath the last costal spot. The hinder marginal line blackish; cilia pale fulvous. Posterior wings gray; cilia gray, with a fulvous hue."

The alar expanse, omitted in the original description, is 8 mm.

The mines of this species are very common on the underside of leaves of oaks. The mine lies between two veins and is nearly rectangular in shape and unwrinkled. At the time of pupation, the

frass, which has been deposited along the edges of the mine, is collected and made into an oval ring-like wall of the cocoon, leaving the cuticle transparent, through which the pupa is plainly visible. It ranges throughout the entire United States. Specimens collected by Lord Walsingham in California and Oregon (of which there is a specimen in the U. S. Nat. Mus.) are identical with the eastern specimens, but somewhat larger and the white streaks are a little broader and more distinct.

Lithocolletis celtisella Chambers.

Plate XXII, Fig. 18.

Lithocolletis celtisella Chambers, Can. Ent., iii, 129, 1871.—Cin. Quart. Jn. Sci., i, 201, 1874.—Bull. Geol. Surv. Terr., iv, 117, 1878.—Frey and Boll, Stett. ent. Zeit., xxxix, 274, 1878.—Chambers, Jn. Cin. Soc. Nat. Hist., ii, 190, 1879.—Walsingham, Ins. Life, ii, 52, 1889.

Syn. *nonfasciella* Chambers, Can. Ent., iii, 108, 1871.—Cin. Quart. Jn. Sci., i, 201, 1874.—*pusillifoliella* Frey and Boll, Stett. ent. Zeit., xxxvii, 226, 1876. —Stett. ent. Zeit., xxxix, 274, 1878.

"Face, palpi and under surface silvery white, the under surface and legs tinged with yellowish; antennæ silvery, annulate above with dark brown. Tuft, thorax and anterior wings saffron yellow, with a white patch in the center of the tuft and the usual white line across the anterior margin and sides of the thorax, which, however, as in other species, is sometimes wanting. When present it is confluent with the rather long narrow median basal white streak, which is faintly dark margined towards the dorsal margin. Just before the middle is a white fascia, angulated near the costa and produced backwards at the angle, and strongly dark margined internally. Near the base of the cilia is another straight white fascia not definitely bounded, anteriorly margined with dark brown and with many dark brown scales interspersed in the white, and sometimes divided into two or three rather indefinite spots. The apex of the thorax is white, and from it a narrow white line passes along the posterior margin of the wing to the first fascia, and sometimes is faintly indicated to the base of the cilia and is margined with dark brown. Apex dusted with dark brown on a white ground, the dusting margined by an oblique white line internally. Sometimes the dusting is not thick, and the whole apical half of the wings is sparsely flecked with dark brown scales. The markings of the apical half of the wing are all indefinite, the colors not being separated by distinct well-marked lines, but to some extent running into each other. Alar expanse less than one-fourth inch. Kentucky. Very abundant. There is some variation in the intensity of the color, some species being much paler than others, and one specimen in my possession has the thorax entirely white."

In the original description, which is reprinted above, Chambers says that the basal streak is "faintly dark margined toward the dorsal margin." In all my specimens (bred), the streak is margined toward the costa and not at all on the dorsal side. The first

fascia in *celtisella* occupies nearly the same position as the second in *celtifoliella*.

This species has been made a synonym of *celtifoliella*, but an examination of specimens of each and a comparison of the early stages shows that *celtisella* and *celtifoliella* are specifically distinct.

Food plant, *Celtis occidentalis* L.

The larva, of the cylindrical type in the later stages, enters the leaf on the lower surface, and makes a narrow linear mine, then cuts through the parenchyma to the upper side, where the mine broadens into an elongate blotch, made tent-like by a longitudinal ridge in each epidermis. The larvæ eat the entire parenchyma, leaving merely the dark discolored cuticles of the leaf.

Mine of *L. celtisella*.

The mines and imagoes of this species are very abundant. Its range is wide, and probably coincides with that of its food plant.

Lithocolletis lucetiella Clemens.

Plate XXII, Fig. 19.

Lithocolletis lucetiella Clemens, Proc. Acad. Nat. Sci. Phil., 319, 322, 1859.—Tin. No. Am., 65, 73, 1872.—Chambers, Can. Ent., iii, 56, 1871.—Walsingham, Ins. Life, ii, 52, 1889.—Busck, Proc. Ent. Soc. Wash., 188, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6262.

Syn. *ænigmatella* Frey and Boll, Stett. ent. Zeit., xxxiv, 219, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 210, 1874.

Antennæ, palpi, face and tuft shining white. Thorax and basal half of the forewings shining white. Apical part of the forewings suffused with golden. A golden costal streak from the base, not extending to the middle. At about the middle is a silvery white fascia, broadly margined with golden on its inner side, and with a black spot on the costa internally. This fascia is also sometimes margined internally towards the dorsal margin with a few black scales. In the apical portion of the wing are two white costal streaks; the first margined internally by a black spot; the second near the tip and unmargined. Nearly opposite the first costal streak is a large dorsal streak dark margined internally by an oblique black line. Cilia golden around the apex, becoming silvery white toward the tornus. Expanse 6-7 mm.

The hindwings and cilia are silvery gray. Legs white, first pair shaded with gray. Abdomen dark gray in the male, silvery in the female; anal tuft silvery.

The mines of this very distinct species are common in the Atlantic States on the underside of leaves of *Tilia Americana* L. The

larva is pale greenish yellow, with a darker head. The mine is rectangular, often nearly square, and placed between two veins and unwrinkled. When complete, the mine is transparent, and the pupa, which is contained in an oval cocoon, is plainly visible.

Lithocolletis symphoricarpella Chambers.

Plate XXII, Fig. 20.

Lithocolletis symphoricarpella Chambers, Cin. Quart. Jn. Sci., ii, 98, 1875.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6311.

Syn. *symphoricarpella* Frey and Boll, Stett. ent. Zeit., xxxix, 271, 1878.—*bolliella* Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6312.

Antennæ grayish, broadly annulate with dark brown. Face and palpi shining yellowish white. Tuft reddish golden.

Thorax and forewings shining brownish golden. Pale markings shining with a faint golden lustre. There is a short indistinct median basal streak. Just before the middle is a slightly curved fascia, inwardly margined with blackish scales and outwardly shading into the ground color of the wing. At the beginning of the cilia is a second fascia, sometimes divided into a costal and an opposite dorsal streak by a line of dark scales. Just preceding the dusted apex is a rather indistinct costal streak. Cilia around the apex, of the wing color, becoming gray at the tornus. Alar expanse 5.5–6 mm.

Hindwings and cilia gray. Abdomen gray. Legs shining gray, tarsi spotted with whitish.

The form described by Frey and Boll is that in which the pair of streaks at the beginning of the cilia do not unite to form a fascia.

While only reported from Ohio, Kentucky and Texas, its range is probably co-extensive with that of its food plant.

The larvæ form very small tent mines on the underside of leaves of *Symphoricarpos Symphoricarpos* (L.) Mac M. The mine is placed between two veins, and when mature is much wrinkled. Just before pupation, one half of the mine is lined with silk, and partitioned off, thus forming an ovoid silken chamber in which the pupa is formed. When the imago emerges the pupa case is thrust through the upper epidermis.

Lithocolletis ostensackenella Fitch.

Plate XXII, Fig. 21.

Argyromiges ostensackenella Fitch, Rept. Ins. N. Y., v, 338, 1859.

Lithocolletis ostensackenella Chambers, Can. Ent., iii, 183, 1871.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6265.

Syn. *ornatella* Chambers, Can. Ent., iii, 161, 1871; iv, 107, 1872; xi, 91, 1879.—Zeller, Verh. Zool.-bot. Ges. Wien, xxv, 347, 1875.—Frey and Boll, Stett. ent. Zeit., xxxiv, 217, 1873.—Walsingham, Ins. Life, ii, 53, 1889

Antennæ dark brown. Face and palpi silvery white, with a purplish and golden iridescent lustre. Tuft small, dark brown. Ground color of the thorax and forewings brilliant golden brown; that of the thorax a shade darker. Two silvery fasciæ, margined internally with dark brown; and beyond them two pair of opposite streaks, also internally dark margined, of which the first pair sometimes unite to form an interrupted fascia. The basal fourth of the wing is dark brown, more golden below the fold toward the base. The first fascia is at the basal fourth, and shades gradually into the ground color of the wing. It is followed at about the middle by a second similar fascia. At the beginning of the costal cilia is a silvery spot, and opposite it a larger dorsal spot. At the apical fifth is a similar costal spot, and opposite it a small dorsal one. Marginal scales at the base of the apical cilia dark brown. Cilia silvery gray. Expanse 5.5–6 mm.

Hindwings and cilia gray. Abdomen dark gray, with a purplish golden lustre. Legs gray.

The mine is a yellow blotch, occurring upon either the upper or lower surface of leaves of *Robinia pseudacacia* L. and *Robinia hispida* L. The leaf is but slightly contracted and the larva is somewhat more flattened than is usual in the cylindrical group. The larva leaves the mine to pupate, spinning a flat, oval, yellowish brown, silken cocoon.

The species is abundant wherever its food plant occurs.

Lithocolletis tritænianella Chambers.

Plate XXII, Fig. 22.

Lithocolletis tritænianella Chambers, Can. Ent., iii, 110, 184, 1871; v. 48, 1873; xi, 89, 1879.—Walsingham, Ins. Life, ii, 53, 1889.—*tritæniella* Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6316.

Syn. *consimilella* Frey and Boll, Stett. ent. Zeit., xxxiv, 214, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 202, 1874; ii, 230. 1875.—Walsingham, Ins. Life. ii, 51, 1889.

Face and palpi white; antennæ white, annulate with fuscous above; tuft saffron, mixed with a few brownish scales.

Thorax and forewings pale reddish saffron. Three white fasciæ, each narrowly margined internally with dark brown scales; the first at about the basal fourth, the second near the middle. The third midway between the second and the apex, is the narrowest and is slightly angulated in the middle. An indistinct oblique whitish costal streak near the apex. Apex slightly dusted with brown mixed with a few white scales. Cilia slightly paler than the ground color. Expanse 7–8 mm.

Hindwings and cilia gray. Abdomen reddish brown. Legs and tarsi whitish; tarsi slightly tipped with black.

The larvæ form rather large tent mines on the upper side of *Ostrya Virginiana* (Mill.) Willd. At first the mine is a flat blotch, and the loosened epidermis is white, sparsely speckled with brown. Later, by contraction of the epidermis, the mine becomes roomy

and tentiform; and the leaf is completely folded over. The larva is green and of the cylindrical type, and spins a thin ovoid silken cocoon, fastened to the leaf above and below. Mr. Chambers (Can. Ent., iii, 84, 1871) described the larvæ and mine of this species under the mistaken impression that they belonged to his *L. virginiella*.

Lithocolletis affinis Frey and Boll.

Lithocolletis affinis Frey and Boll, Stett. ent. Zeit., xxxvii, 222, 1876; xxxix, 270. 1878.—Walsingham, Ins. Life, ii, 51, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6314.

The head, thorax and forewings are of a uniformly dark reddish saffron. Face and palpi shining white, legs whitish gray. The tarsi of the first pair have distinct blackish bands. The second pair are spotted with blackish, the last pair are lighter, marked with brownish black. The dorsal side of the abdomen is dark gray, the ventral side whitish.

The feebly shining forewings have three fasciæ, at the basal third, at the middle, and at three-quarters of the wing length respectively. All the fasciæ are faintly dark margined toward the base, the first straight, the second slightly concave, the third feebly angulated. Before the apex there is a white costal streak, without any dark margining. The cilia are of the ground color.

Hindwings rather dark gray, their cilia lighter brownish.

Frey and Boll have thus described the species.

Found in Texas, where the larvæ make underside mines on a species of *Lonicera*, and on a species of *Symphoricarpos*.

The absence of any dark dusting in the apex of the wing distinguishes the imago of this species from that of *tritæmianella* Cham.

Lithocolletis mariæella Chambers.

Plate XXII, Fig. 23.

Lithocolletis mariæella Chambers, Cin. Quart. Jn. Sci., ii, 99, 1875.—Can. Ent., xi, 92, 1879.—Walsingham, Trans. Am. Ent. Soc., x, 201, 1882.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6315.

Syn. *mariella* Riley, Smith's List Lep. Bor. Am., 190, 1891.

Face and palpi whitish; last joints of the palpi darkened externally. Antennæ grayish white, annulate with brown. Tuft reddish orange.

Thorax and forewings golden brown. Two white fasciæ, one at the basal fourth, and the other at the middle of the wing length, both bent outward near the median line, and margined with dark brown internally. At the beginning of the costal cilia is a white streak nearly meeting an opposite dorsal streak, both dark margined internally. A curved white streak, margined before by a darker shade, encloses the apex, and sometimes extends through the cilia on the dorsal margin. The apex of the wing is sometimes darkened by a few brown scales. Cilia a shade paler than the wings. Expanse 8-8.5 mm.

Hindwings gray, with reddish cilia. Abdomen brownish gray. Hind legs brownish red; the other two pair whitish, banded with black.

Missouri.

The tentiform mine of this species occurs on the lower surface of leaves of *Symphoricarpos vulgaris* Michx. Pupation takes place within an ovoid white silken cocoon. Mr. Chambers (Cin. Quart. Jn. Sci., ii, 99, 1875) quotes Miss Murtfeldt's description of the early stages of this species.

Lithocolletis tiliacella Chambers.

Plate XXII, Fig. 24.

Lithocolletis tiliacella Chambers, Can. Ent., iii, 56, 1871.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6310.

Syn. *tiliæella* Chambers, Cin. Quart. Jn. Sci., i, 203, 1874.—*tiliella* Walsingham, Ins. Life, iii, 328, 1891.

"Glistening, snowy white; middle portion of the anterior wings from near their base to the base of the cilia pale golden, which is produced along the costa to the base—three broad silvery white fasciæ dark margined internally; the dark margin of the third fascia widely interrupted in the middle, and the pale golden very indistinct, sometimes not visible, behind it; the second fascia is about the middle of the wing. Alar expanse one-fourth inch."

Chambers has sufficiently characterized this species by the short description above.

The larvæ belong to the cylindrical group and form almost circular tent mines on the upper side of *Tilia Americana* L. The mine is white, densely speckled with dark brown. The pupa of the summer brood is suspended in a very slight silken web; in the brood remaining through the winter in the pupal state, a denser cocoon is spun, which is attached above and below.

The species is common throughout the Atlantic States.

Lithocolletis oregonensis Walsingham.

Lithocolletis oregonensis Walsingham, Ins. Life, ii, 117, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6309.

"Antennæ closely annulate with white and brown. Palpi whitish, dusted with gray externally. Haustellum yellow. Face grayish, frontal tuft grayish fuscous. Thorax golden saffron.

"Forewings golden saffron, with four rather shining white fasciæ, and a semicircular white apical streak inclosing a black apical spot and reaching through the cilia on the costal and dorsal margins; the first fascia is situated within one-fourth the wing length, the dorsal portion of it commencing nearer to the base than the costal portion and proceeding obliquely outward to a little above the fold, the shorter costal portion only being conspicuously dark margined internally; the second fascia, just before the middle, is distinctly curved, almost angulated outwards, and has a conspicuous margin of black scales on its inner side; the third fascia, commencing before the costal cilia, is less curved than the

second, but its black inner margin interrupts it in the middle by a short line of black scales; the fourth fascia, at the apical fifth of the wing, is also internally black margined, but the black scaling is almost interrupted, becoming very slender at the middle of the wings; the apical spot is black, encircled by white as already described; the cilia are grayish, tinged with fuscous about the anal angle, and with a short golden saffron dash from the black apical spot; there is no line along their base.

Hindwings and cilia pale grayish. Abdomen gray. Hind tarsi whitish, thickly spotted with fuscous above. Expanse 7 mm."

Described by Lord Walsingham from two specimens taken on the wing near Fort The Dalles, on the Columbia River, in Northern Oregon, in April, 1872.

Lithocolletis fragilella Frey and Boll.

Plate XXIII, Fig. 1.

Lithocolletis fragilella Frey and Boll, Stett. ent. Zeit., xxxix, 270, 1878.—Walsingham, Ins. Life, ii, 51, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6313.

Syn. *trifasciella* Frey and Boll (not Haworth), Stett. ent. Zeit., xxxiv, 215, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 205, 1874.—Walsingham, Ins. Life, iii, 326, 1891.

Antennæ dark brown, narrowly annulate with pale gray. Face and palpi pale golden. Tuft on the vertex reddish orange, with a few brown scales intermixed.

Thorax and forewings deep reddish saffron. On the forewings are three faintly indicated narrow whitish fasciæ situated at the basal fifth, two fifths, and three-fifths of the wing length, respectively.

The two former are bent outward above the middle, the third is nearly straight. These fasciæ are sparsely dusted internally on the dorsal half with blackish scales, densely so on the costal half, where the margin broadens into a triangular area, that of the first fascia sometimes being produced along the costa to the base. The internal margin of the third fascia interrupts it in the middle with a tooth-like projection. At three-fourths of the wing length on the costa is a patch of dark dusting forming the internal margin of a pale costal streak, opposite to which on the dorsal margin above the tornus is a smaller patch of dusting. Just before the apex is a second whitish costal streak, dusted internally with a few dark scales. Apex sparsely dusted with black scales. Cilia of the wing color becoming gray toward the tornus. Alar expanse 8.5–9 mm.

Hindwings and cilia gray, with a fulvous tinge. Abdomen dark brownish gray, anal tuft with an ocherous tinge. Legs brownish, tarsal joints blackish, tipped with white.

Massachusetts to Texas. This species is identical with that erroneously identified by Frey and Boll as *trifasciella* Haw. from a specimen bred from *Lonicera sempervirens* Ait. at Cambridge, Mass. (Stett. ent. Zeit., xxxiv, 215, 1873). The food plant of the Texan

specimens was given as *Lonicera "albida"* (such a plant has never been catalogued). The mine is placed on the underside of the leaf. A large series bred by Mr. August Busck on *Lonicera sempervirens* Ait. is in the U. S. Nat. Mus.

Lithocolletis salicifoliella Clem.

Plate XXIII, Figs. 2, 3; XXIV, Fig. 24.

Lithocolletis salicifoliella Clemens, Proc. Ent. Soc. Phil., i, 81, 1861.—Tin. No. Am., 169, 1872.—Packard, Guide Stud. Ins., 353, 1869.—Chambers, Can. Ent., iii, 163, 185, 1871.—Cin. Quart. Jn. Sci., ii, 302, 1875.—Can. Ent., vii, 126, 1875.—Bull. Geol. Surv. Terr., iii, 139, 1877.—Walsingham, Ins. Life, ii, 54, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6333.

Syn. *atomariella* Zeller, Verh. zool.-bot. Ges. Wien, xxv, 350, 1875.—Walsingham, Ins. Life, ii, 54, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6332.

Antennæ white, more or less distinctly annulate with brown. Face and palpi white; tuft white, sometimes thickly interspersed with brown scales.

The following is Chambers' description of the forewings in Can. Ent., vii, 126, 1875:

"Thorax and primaries bright golden or saffron yellow, according to the light, or even sometimes dull brownish yellow, the thorax and basal portion of the dorsal margin of the forewings being largely intermixed with white, and dusted more or less with black. Sometimes the inner angle is of the general ground hue, scarcely dusted or marked with either white or dark brown, and then there is a median white basal streak which meets at an acute angle with a dorsal white streak about the basal fourth of the wing length. Both of these white streaks, and all other white markings on the wings are more or less dusted with dark gray-brown, sometimes so much as to obscure the white. Before the middle of the costa is a long white streak, which attains the middle of the wing, curving backwards; a little behind this, on the dorsal margin, is a large dorsal white streak, wide on the margin, but shorter than the first costal streak, like which it curves backwards along the middle of the wing, being usually confluent, or very nearly so with the first costal streak; a little further back, about the middle of the costal margin, is another white costal streak shorter than the first, but like it curving back along the middle of the wing, and usually confluent with the first costal and first dorsal streaks. Then follows another narrower and somewhat oblique costal white streak, opposite to which is a triangular white dorsal spot separated from it by some brown scales; just before the cilia is a curved white fascia concave towards the apex and sometimes interrupted in the middle, and just before the apex is another similar fascia, which, however, sometimes does not attain the dorsal margin, and behind it in the apex is a short brown streak. All these white streaks and fasciæ are decidedly dark margined before, and more or less dusted with grayish brown. There is a brown hinder marginal line at the base of the cilia, which latter are stramineous."

Expanse 7-8 mm.

The hindwings are gray, with ocherous tinged cilia; pale ocher-

ous in the summer form. Abdomen gray, with ocherous apex. Legs varying from pale whitish ocherous to gray, their tarsi whitish at the bases, grayish brown toward the apices.

This species is probably found over the whole of the United States. In the U. S. Nat. Mus. is a series bred by Dr. Dyar at Denver, Colorado, on cottonwood in July, 1901, and a specimen from California on *Salix* (collection C. V. Riley).

The food plants are various species of *Salix* and *Populus*, the mine being placed on the lower side of the leaf. The imagoes of the fall brood, which appear in October, hibernate.

This is an exceedingly variable species, so variable in fact, that specimens of the different broods may easily be mistaken for distinct species. The differences are due to a variation in the extent of the white markings, and in the black dusting, some specimens lacking entirely the black dusting typical of the species.

I have bred series of this species in successive broods from tentiform mines on the underside of leaves of *Populus balsamifera* L. In the imagoes which appear in August, the black dusting is almost or entirely lacking. One of these is represented on Plate XXIII, Fig. 3. Such specimens are identical with those bred by Dr. Dyar in Colorado. In this form the tuft and thorax are often pure white, and very often the first dorsal streak is widely separated from the first costal streak, with which it is usually confluent in the dusted specimens.

Zeller, in his description of *atomariella*, and Chambers, in his earlier description (Can. Ent., iii, 163, 1871), regarded white as the ground color of the wings. Zeller's two types at Cambridge are identical with Chambers' specimens, which represent the dusted form of the species (Plate XXIII, Fig. 2). The Zeller type at the U. S. Nat. Mus. (Plate XXIV, Fig. 24) has a greater extent of the wing occupied by the white markings.

Lithocolletis tremuloidiella Braun.

Plate XXIII, Fig. 4.

Lithocolletis tremuloidiella Braun, Ent. News, xix, 102, 1908.

Antennæ dark gray, the joints becoming lighter toward their bases. Palpi grayish white. Face grayish white. Tuft gray, mixed with white.

Forewings pale reddish brown near the base, becoming more ocherous beyond the middle. There is a short median basal white streak, and a dorso-basal white streak, both thickly dusted with blackish scales, and uniting with the first dor-

sal streak. There are five costal and five dorsal white streaks, all dark margined internally and more or less dusted with blackish scales, the last two pair, however, not dusted. These streaks are situated as follows: a large oblique white costal streak at the basal fifth, attaining the middle of the wing and prolonged backward; nearer the base an oblique dorsal streak, almost meeting the first costal before the middle; the second costal streak also oblique; the second dorsal streak nearer the base than the second costal, large, oblique, strongly constricted just below the fold, and uniting with the apices of the first and second costal streaks; third costal and dorsal streaks nearly opposite, less oblique, their apices separated by a narrow prolongation of the blackish internal margins. The fourth costal and dorsal streaks, of which the costal is at the apical fourth, the dorsal at the tornus, form an inwardly convex white fascia. Fifth costal and dorsal streaks also form a curved white fascia. An irregular blackish apical spot. Marginal line in the cilia blackish, with a bluish lustre. Cilia gray. Alar expanse 9-10.5 mm.

Hindwings gray. Cilia gray, with a reddish tinge. Abdomen dark gray above, grayish white beneath. Anal tuft grayish ocherous. Legs dark gray, tips of the tarsi lighter.

Described from specimens bred by Mr. W. D. Kearfott from tentiform mines on the underside of leaves of *Populus tremuloides* Michx., received from Mr. J. W. Cockle, Kaslo, B. C., August 26, 1907. The imagoes appeared during the same month. The mine is large (for an underside *Lithocolletis* mine), oval, and with a fine fold through its long axis. It closely resembles the mine of *L. salicifoliella* on poplar, but is very much larger.

There is considerable variation in the extent of the white markings; sometimes the fascia formed by the fourth pair of streaks is interrupted, and the fascia just before the apex does not reach the inner margin.

This species is very close to *L. salicifoliella* in the character and arrangement of markings; but may be distinguished from it by the much greater expanse, the slightly shining and more reddish ground color of the forewings, the slightly less oblique position of the white streaks, and by the noticeable bluish lustre of the marginal line in the cilia. The specimens which appear in August are densely dusted, in this respect differing from the corresponding brood of *L. salicifoliella*.

By some mistake, this species has been referred to as *Lithocolletis populiella* Chambers by Mr. Busck in his paper, "Tineid Moths from British Columbia" (Proc. U. S. Nat. Mus., xxvii, 770, 1904), and by Dr. Harrison G. Dyar in "Lepidoptera of the Kootenai District" (Proc. U. S. Nat. Mus., xxvii, 937, 1904).

Lithocolletis celtifoliella Chambers.

Plate XXIII, Fig. 5.

Lithocolletis celtifoliella Chambers, Can. Ent., iii, 128, 1871.—Bull. Geol. Surv. Terr., iv, 118, 1878.—Walsingham, Ins. Life, ii, 52, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6286.

"Face and palpi silvery white, the palpi on their outer surface saffron, flecked with brown. Antennæ brown, annulate with white, and flecked with blackish scales. Tuft reddish saffron, with white scales intermixed. Thorax reddish saffron anteriorly, passing into brown toward the apex, sparsely flecked with white, and with the usual white line (sometimes absent), across the anterior margin produced backwards over the tegulæ and on to the wings, where it is confluent with a narrow median white basal streak which is strongly dark margined dorsally, the dark margin being produced beyond it nearly to the middle of the wing. Anterior wings reddish saffron, the dorsal margin nearly to the cilia, thickly dusted with dark brown on a white ground, and with a streak of dark brown extending to the basal streak not far from the base. Three fasciæ, rather indefinitely bounded, of dark brown upon a white ground; all strongly angulated posteriorly about the middle, the third one slightly interrupted near the costa and passing gradually into a costo-apical patch of dark brown on a white ground. The first fascia is just before the middle; the second is about the middle, and each sends a white streak from its angle nearly to the next fascia. There is a dorso-apical patch of dense dark brown dusting on a white ground, larger than the costo-apical one above mentioned. Cilia pale reddish saffron, with a dark brown hinder marginal line in the cilia. Sometimes almost the entire thorax and dorsal margins of the wings are densely dusted with dark brown on a white ground, whilst the first and second fasciæ blend with each other near the dorsal margin, and the third fascia blends with the dorso-apical dusting. It varies in the extent and intensity of the dusting. Under surface silvery white, with a patch of dark brown dusting on each side of of each abdominal segment. Legs silvery white, with the anterior tibiæ and tarsi reddish saffron, dusted thickly with dark brown, and the intermediate and posterior tibiæ and tarsi spotted and annulate with dark brown. Alar expanse one-fourth inch. Kentucky. Not common. The larva is cylindrical, yellowish, and makes a tent mine on the under surface of the leaves of the hackberry (*Celtis occidentalis* L.)."

The above extract from the Can. Ent., iii, 128, 1871, is Chambers' original description of the species with his note upon the larval stage.

There is great variation in the density of the dark dusting; in one specimen the white fasciæ are distinctly present as narrow white lines, beyond what would in this case be considered their internal dusting (the three dark brown fasciæ of which Chambers speaks). The first of these fasciæ reaches the costa at about the basal third. Often the basal streak is overlaid with black dusting, which then occupies the basal portion of the wing below the fold. This species is much less common than *L. celtisella* Chambers, which mines the upper surface of *Celtis*.

Chambers records this rare species from Kentucky. I have taken it at Cincinnati, Ohio, and Mr. W. D. Kearfott has collected the mines in the early part of September in Jefferson County, West Virginia.

The mine, which is of the usual underside type, lies between two veins, and is somewhat variable in shape. The pupa is suspended in a few silken threads. The imagoes appear during the latter part of September.

Lithocolletis lysimachiæella Chambers.

Lithocolletis lysimachiæella Chambers, Cin. Quart. Jn. Sci., ii, 100, 1875.—Walsingham, Ins. Life, ii, 77, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902. No. 6336.

This is a name given to a species in the larval state, whose tentiform mines were found on the underside of *Lysimachia lanceolata* Walt. (*Steironema lanceolatum* (Walt) A. Gray). No imago was ever bred. I have never seen a mine of a *Lithocolletis* on this plant.

GROUP II.

The larva of the *flat group* (Plate XX, Fig. 10) is very much depressed, almost flat, with the sides of the segments projecting, thus giving the entire larva a beaded appearance. The head is flat, somewhat triangular in shape, usually of a shining reddish brown color, with the mouth parts projecting in front. The first three segments of the body are broader than the others; the body tapers toward the posterior end. While the legs are of the same number and occupy the same position as in the cylindrical larva, all are very rudimentary, appearing as small tubercular projections. Upon the upper and lower side of most and sometimes all of the body segments are distinctly outlined, shining, darker spots—the maculæ. These vary in shape on the different segments, being elliptical or trapezoidal, but are constant for a given species in each stage. After the seventh or last moult, the larva assumes a more cylindrical shape, the legs are better developed, and the dark maculæ gradually disappear.

All of the species are miners on the upper side of leaves, where they make a flat, sometimes irregularly shaped blotch, or a rather broad, linear tract. The larva feeds from the centre outwardly, thus gradually increasing the extent of the mined portion of the leaf. This mode of feeding is a necessary accompaniment of the

flattened head, the larva being able to consume but a few layers of parenchyma cells directly in front of it.

The mine retains its flat blotch-like character until after the seventh moult. The larva then lines the loosened epidermis with silk and by contraction produces from one to three narrow folds or ridges. Beneath this folded portion the floor of the mine is thinly covered with silk. Then the larva, lying on its back, spins a flat semi-transparent sheet of silk, oval or nearly circular in shape, attached around its edges to the floor of the mine (Plate XX, Fig. 12). Beneath this, along its long axis, the pupa is formed. The pupa, which is protruded from the mine in emergence, is thrust through a transverse slit near one end of the flat cocoon. Such a cocoon is formed in all but a few of the species of which the life history is known.

In almost all of the species, however, this cocoon is only made in the brood of which the imagoes are to appear in the same summer. In a later brood, the hibernating period, with one or two exceptions, is passed in the larval state. In a number of species, hibernation takes place beneath the folded epidermis. In most cases, however, an especially prepared silken-lined chamber is formed. After the floor of the mine is loosely covered with silk, the upper epidermis is fastened down in a circular or oval outline, and the whole cavity is then lined with silk. Ample space is provided by a characteristic oval or hemispherical projection upon the underside of the leaf. The change to pupa occurs in the spring.

The moths of this group may easily be recognized by the fact that the white markings of the forewings are always externally dark margined, often densely dusted with black scales behind. In some cases there is, in addition, a slight internal margin consisting of a few dark scales near the costa. The markings consist of white costal and dorsal streaks, usually oblique. Opposite streaks may unite to form a fascia, either outwardly angulated or straight. Where the fasciæ are straight, they are nearer the base on the dorsal margin. The apex of the wing is often densely dusted with black atoms, this effect being produced by the black tips to whitish scales. Sometimes these black tips form a distinct marginal line, which passes around the apex and usually extends to the tornus. This line is always present, but where the apex is not dusted, is not

noticeable. Beyond this, a second line runs through the middle of the cilia. This line is formed by the tips of a row of scales of equal length.

The following table will separate the species:

A. Oblique costal and dorsal streaks; fasciæ, if present, distinctly angulated: never two straight fasciæ.
  B. Ground color of the forewings white.....**hamadryadella.**
  BB. Ground color of the forewings not white.
    C. An oblique white streak or patch at the base of the dorsal margin, rarely indistinct (*lentella, caryæfoliella*), or indicated by its dark margin only (*agrifoliella*); usually two angulated fasciæ.
      D. First pair of costal and dorsal streaks nearly perpendicular; second pair very oblique.
        E. A white costal patch near the base.....**umbellulariæ.**
        EE. White costal patch indicated by dark margin only.
agrifoliella.
      DD. First pair of streaks parallel to the second pair.
        E. No costal streak before the middle; a median fascia.
saccharella.
        EE. A fascia at one-fourth and one-half.
          F. White streak at base of dorsum indistinct or indicated by external dark scales only.
            G. Third costal streak long and usually uniting with the third dorsal.....**caryæfoliella.**
            GG. Third costal streak merely a spot.....**lentella.**
          FF. White streak at base of dorsum large and distinct.
            G. A tuft of brown scales in the apical cilia...**macrocarpella.**
            GG. No such scales.....**cincinnatiella.**
    CC. No such pale streak at base of dorsum.
      D. Dorsal margin white from base to beyond middle.
        E. Dorso-basal streak extending to oblique streak above the cilia.
          F. Antennæ annulate with brown for their whole length.
conglomeratella.
          FF. Basal third of antennæ pure white.....**ulmella.**
        EE. Dorso-basal streak extending but little beyond the middle of the dorsal margin.
          F. An oblique dorsal streak at end of basal streak.
mediodorsella.
          FF. No such streak.....**quercivorella.**
      DD. Dorsal margin not white.
        E. Costal and dorsal spots large; but little oblique, first pair meeting or almost meeting.
          F. Apex enclosed in a conspicuous semi-circular white streak.
gaultheriella.
          FF. Last costal streak not extended across the wing.....**nemoris.**
        EE. Not as above; first pair of streaks widely separated.

F. Dorsal streak beyond fascia oblique.....**australisella.**
FF. Dorsal streak beyond fascia perpendicular or absent.
G. With two costal streaks or spots before the white streak or spot forming the anterior edge of the apical dusting.
H. Costal streaks unmargined.....**chambersella.**
HH. Costal streaks margined.
I. Ground color of wings pale, with a coppery lustre toward the apex; marks very indistinct.....**cervina.**
II. Ground color saffron, marks white....**platanoidiella.**
GG. With at most one costal streak before the white streak or spot forming the anterior edge of the apical dusting.
H. Median fascia but slightly angulated; other white marks small or absent.
I. Costal and dorsal streaks absent.....**fasciella.**
II. Costal and dorsal streaks present.....**castaneaella.**
HH. Median fascia sharply angulated; white marks conspicuous.
I. First dorsal streak long, oblique, curved ...**fletcherella.**
II. First dorsal streak perpendicular.
J. Marks dull white, faintly margined.....**betulivora.**
JJ. Marks shining white, strongly margined.
K. External dusting at angle of fascia produced backward; apex densely dusted .....**bethunella.**
KK. Externally margin of fascia not produced.
L. Size large (10 mm.); first dorsal streak very large.
arcuella.
LL. Size small; first dorsal streak short.
eppelsheimii.
AA. Two straight or nearly straight fasciæ, nearer the base on the dorsal margin.
B. No costal or dorsal streaks beyond fasciæ.....**tubiferella.**
BB. A costal and a dorsal streak at three-fourths.
C. Without a paler streak at the base of the dorsal margin.
D. Apical dusting black on a whitish ground and extended to the tornus.
guttifinitella.
DD. Apex velvety black, dusting not extended to tornus.
obstrictella.
CC. With a white streak or paler shade from inner angle to fold.
D. First fascia and its dark margin broken near the costa.
æsculisella.
DD. First fascia complete.
E. Color deep reddish; not ocherous.....**hamameliella.**
EE. Color more ocherous.
F. Scales of the apical third tipped with brown, marginal line in the cilia distinct .....**ostryaella.**
FF. Apical third not dusted, marginal line indistinct.
G. Apex of dorsal streak above cilia directed toward opposite costal streak.....**corylisella.**
GG. Dorsal streak above cilia curved and directed toward apex.
aceriella.

Lithocolletis gaultheriella Walsingham.

Plate XXIII, Fig. 6.

Lithocolletis gaultheriella Walsingham, Ins. Life, ii, 79, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1903, No. 6291.

"Antennæ closely annulated with white and brown, the brown annulations somewhat wider apart toward the apex.

"Palpi silvery white, with a small spot on the outer side. Head, face silvery white; frontal tuft saffron, mixed with white. Thorax golden saffron, posteriorly whitish.

"Forewings golden saffron, shading to golden brown, no basal streak, three costal and three dorsal snow-white spots, the first two pairs internally dark margined; the first costal spot is situated at about one-third the length of the wing, its internal dark margin passing around its apex; the corresponding dorsal spot commences nearer the base of the wing and sometimes reaches obliquely to, or near, the point of the costal spot; the second costal spot at half the wing length is somewhat oblique, square ended, and as in the case of the first is placed somewhat beyond its smaller corresponding dorsal spot, which is pointed and has some dark fuscous scales running outwardly from its apex and merging in the darkened lower margin of the costal spot above it; the third costal spot at one-fourth from the apex is somewhat triangular and lies also farther from the base than the corresponding smaller spot on the dorsal margin; before the anal angle between these spots, lies a cloud of fuscous scaling serving to throw up and make more conspicuous these white markings on the golden brown ground color of the wing; inclosing the apex of the wing is a narrow, outwardly concave white streak, not reaching through the cilia on the apical but only on the costal margin; beyond it are a few darkened scales and sometimes one on two whitish ones with them; cilia pale, golden saffron, tending to golden; gray about the anal angle. The only conspicuous markings on the under side are two pale spots in the costal fringes, corresponding with the last two markings on the upper side.

"Hindwings grayish, with golden gray cilia. Abdomen gray, anal tuft slightly paler. Hind tarsi grayish white, with one or two darker bands above. Expanse 10–11 mm."

The above is Lord Walsingham's description.

Western United States and British Columbia (Rev. George W. Taylor). The mine, on the upper side of *Gaultheria shallon*, is a large, somewhat irregular blotch, occupying about half the leaf. When mature, the leaf is slightly folded and the epidermis lies in two fine ridges across one end of the mine.

Lithocolletis nemoris Walsingham.

Plate XXIII, Fig. 7.

Lithocolletis nemoris Walsingham, Ins. Life, ii, 116, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6293.

"Antennæ white, spotted above with fawn brown. Palpi white, face white, frontal tuft whitish, much mixed with saffron brown, especially at the sides. Thorax saffron.

"Forewings rather shining saffron, with snow-white markings consisting of two transverse fascia, slightly oblique, and angulated beneath the costal margin, beyond which are one dorsal and two costal streaks; there is no basal streak; the first fascia at one-fourth the wing length is but slightly angulated, margined with scattered blackish scales, widely on its outer and very indistinctly on its inner side. The second fascia at the middle of the wing is rather more strongly angulated than the first; this is also slenderly dark margined internally and more widely so externally; the black dusting on its outer side being produced backwards at the angle in the direction of the first costal streak; this is at the commencement of the costal cilia, rather further from the base than the first dorsal streak, which is oblique, its point terminating below the point of the first costal streak; from the points of these two streaks a cloud of black scales proceeds outwards along the middle of the wing, forming a dark patch below, and beyond the second costal streak which is situated just before the apex; the cilia are saffron shading to pale grayish saffron beyond their faintly darker median line.

"Hindwings and cilia pale grayish, with a very faint saffron tinge. Abdomen pale gray, anal tuft saffron yellow. Hind tarsi white, with two grayish fuscous bars above. Expanse 8 mm.

"The puckered mines of this species were found in some abundance in June, 1871, in Mendocino County, California, on the upper sides of leaves of *Vaccinium ovata,* the mine occupying the whole surface of each leaf, and causing the margins to approach each other."

The above is Lord Walsingham's description.

Lithocolletis caryæfoliella Clemens.

Plate XXIII, Fig. 8.

Lithocolletis caryæfoliella Clemens, Proc. Acad. Nat. Sci. Phil., 323, 1859.—Tin. No. Am., 65, 74, 1872.—Chambers, Can. Ent., iii, 109, 165, 1871.—Frey and Boll, Stett. ent. Zeit., xxxix, 273, 1878.—Busck, Proc. Ent. Soc. Wash., v, 189, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6288.

Syn. *juglandiella* Clemens, Proc. Ent. Soc. Phil., i, 81, 1861.—Tin. No. Am., 170, 1872.—Chambers, Can. Ent., iii, 165, 1871; xi, 91, 1879.—Packard, Guide Stud. Ins., 353, 1869.

"Antennæ silvery, annulated with blackish. Front silvery. Tuft and thorax reddish orange. Forewings reddish orange, with three silvery bands, black margined externally, the second about the middle of the wing, angulated, with the black margin broad and produced posteriorly on a whitish ground, nearly to the third, which is somewhat interrupted in the middle; the first midway between the second and the base of the wing and also angulated near the costa. The apical portion of the wing white, covered with dispersed black scales, with a few black scales on a whitish ground, on the costa, between the last silvery band and the dusted apical portion; with two hinder marginal lines, one the margin of the apical scales, the other a dark brownish line in the cilia. Hindwings pale brownish gray; cilia gray, with a fulvous hue."

This species, of which the above is Clemens' description, is the the common miner on the upper side of hickory in the eastern United States. The mines are irregular blotches; often two or more mines are confluent. The pupa is formed under an oval silken flat cocoon. The mine occasionally occurs on leaves of walnut and butternut.

Imagoes vary greatly in the distinctness of the fasciæ and the dark dusting; often the first fascia does not extend to the costa. There is a faintly indicated pale basal streak from the inner angle to the fold.

Alar expanse 6–7 mm.

Lithocolletis lentella sp. nov.

Plate XXIII, Fig. 9.

Antennæ grayish, broadly annulate with dark brown. Face and palpi whitish, sometimes with a golden tinge. Tuft reddish saffron, mixed with whitish scales behind.

Thorax and forewings deep reddish saffron. A narrow white line on each side of the thorax is continuous with an indistinct curved whitish basal streak at the inner angle. This streak is sometimes absent, its position being indicated by the few black scales which form its external margin. There are two angulated white fasciæ, the first at about the basal third, the second at the middle of wing length, both strongly margined externally, and on the costa internally with black scales. The first of these fasciæ sometimes consists only of a costal and a dorsal streak, not connected, but of which the black dusting is continuous. At the apical third is a white costal spot, margined on both sides, and beneath with black scales. Beginning a little farther from the base is a long oblique dorsal streak, strongly margined behind with black scales. Opposite its apex is a small white costal spot overlaid with black scales. Apex of the wing densely dusted with black on a whitish ground. A dark brown line runs through the middle of the cilia, which are grayish ocherous, becoming gray toward the tornus. Alar expanse 6.5–7 mm.

Hindwings gray. Cilia gray, with an ocherous tinge. Abdomen dark gray above, pale reddish beneath. Anal tuft reddish. Hind tibiæ reddish toward their apices, tarsi white, annulate with black.

Described from eleven specimens; five bred from a blotch mine on the upperside of black birch, *Betula lenta* L., from Caldwell, N. J., in July, 1902, by Mr. W. D. Kearfott; two bred from a much wrinkled blotch mine on the upperside of *Ostrya Virginiana*, Hamilton County, Ohio, in June, 1908; one flown specimen, Caldwell, N. J., May 17th, Mr.

Mine of *L. lentella.*

W. D. Kearfott, and three in the National Museum, collected by Mr. August Busck, Washington, D. C., July, 1903.

The mine on *Ostrya* is very characteristic and easily distinguished from that of any other species of the flat group by the numerous longitudinal folds in the loosened epidermis at maturity, causing the opposite halves of the leaf to approach one another.

Lithocolletis saccharella Braun.

Plate XXIII, Fig. 10.

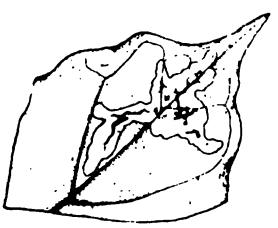
Lithocolletis saccharella Braun, Ent. News, xix, 104, 1908.

Antennæ pale ocherous, beyond the basal third annulate with dark; several joints toward the tip dark. Palpi shining white. Face shining white. Tuft whitish, golden toward the sides.

Thorax and forewings ocherous. A white stripe on each side of the middle of the thorax is continuous with a very oblique curved white streak at the inner angle of the forewing. This streak, which is sometimes dark margined behind, extends to the fold and is usually prolonged along the fold to unite with the first dorsal streak. The first dorsal streak begins at the basal fifth, is oblique and curved, and extends slightly more than halfway across the wing. The second dorsal streak, at about the middle of the dorsal margin, is also oblique and curved, and near the costa its apex meets that of the first costal streak, which is short, oblique and placed slightly beyond the middle, thus forming an acutely angled, interrupted fascia. The second costal streak at the apical fourth is sometimes almost overlaid with black scales. Above the dorsal cilia is a long oblique white streak. All the streaks are dark margined externally. Apical portion white, dusted with black. There is considerable variation in the extent of the black dusting, which sometimes extends to the tornus. Marginal line in the cilia brownish ocherous. Cilia pale ocherous. Alar expanse 5-7 mm.

Hindwings pale grayish ocherous. Cilia pale ocherous. Abdomen gray above, pale ocherous below. Anal tuft ocherous. Legs whitish. Hind tarsi faintly tipped with black.

Described from specimens bred at Cincinnati, Ohio. I also have specimens taken in Essex Co. Park, N. J., by Mr. W. D. Kearfott.



Mine of *L. saccharella*.

The mines of this species are very common on sugar maples, *Acer saccharum* Marsh. and *Acer nigrum* Michx., as many as 25 or 30 mines sometimes occurring on one leaf. The mine is a small irregular blotch on the upper side. The pupa is not enclosed in a cocoon. The imagoes appear from May to June and again in August.

Mr. Chambers (Can. Ent., iii, 130, 1871) confused this species with *L. aceriella* Clem., which it in no way resembles.

Lithocolletis macrocarpella Frey and Boll.

(Plate XXIII, Fig. 11.)

Lithocolletis macrocarpella Frey and Boll, Stett. ent. Zeit., xxxix, 261, 1878.—Walsingham, Ins. Life, ii, 78, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6289.

Face, palpi and underside of the antennæ white, antennæ above annulate with brown; tuft white, mixed with brown and saffron scales.

Thorax brownish saffron, with its apex and two longitudinal stripes white. Sometimes almost the entire thorax is white. Forewings brownish saffron, very feebly shining. A broad curved basal streak from the inner margin to the fold is densely dusted behind with blackish scales. Two white fasciæ angulated near the costa, one at the basal third, the other at the middle of the wing length; the dorsal arm of each slightly curved. Each fascia is internally margined by a few black scales near the costal and the dorsal margins. On the outer side the costal arm of each has a few black scales near the costa; the dorsal arm is densely dusted with blackish scales, which are produced backward at the angle. A white costal streak at two-thirds is dusted with blackish scales. Opposite it is an oblique curved dorsal streak, dusted behind with blackish scales, running into the dusted apical portion. Before the apex is a white costal streak with a few black scales before it on the costa. Apical part of the wing dusted with black on a white ground. Hinder marginal line in the cilia brownish, with a few blackish scales intermixed. Cilia around the apex of the wing color, grayish toward the tornus. In the cilia, extending outwards from the apex, is a small pencil of dark brown scales. Expanse 8.5–9 mm.

Hindwings brownish gray, with somewhat lighter cilia. Abdomen in the male dark gray, in the female lighter, somewhat ocherous. Anal tuft ocherous brown. Legs and tarsi whitish, spotted with dark brown.

This species was originally described by Frey and Boll from specimens from mines on the upperside of leaves of *Quercus macrocarpa* Michx. in Texas. I have a series of specimens bred by Mr. W. D. Kearfott from blotch mines on the upperside of leaves of chestnut, Montclair, N. J. The density of the black dusting varies somewhat, and in one specimen the basal streak is confluent with the dorsal arm of the first fascia.

Very close to *L. cincinnatiella* Chambers, but distinguished from it by the larger size, darker and less shining ground color of the forewings; the more oblique and slightly curved dorsal streaks; and the tuft of dark brown scales in the apical cilia, which is wanting in *cincinnatiella*.

The mine of *macrocarpella* also differs from that of *cincinnatiella*, being of the usual upperside blotch type and containing but a single larva.

Lithocolletis cincinnatiella Chambers.

Plate XXIII, Fig. 12.

Lithocolletis cincinnatiella Chambers, Can. Ent., iii, 146, 149, 1871.—Cin. Quart. Jn. Sci., i, 203, 1874.—Bull. Geol. Surv. Terr., iii, 141, 1877.—Walsingham, Ins. Life, ii, 78, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6287.

"Face, palpi, under surface and legs silvery white, the legs marked on their anterior surface with golden and brownish spots and bands: tuft white, golden at the sides; antennæ silvery white beneath, above golden brown, faintly annulate with whitish; thorax and anterior wings bright golden; upon the wings is a short snow-white median basal streak strongly dark margined behind and within. (Sometimes the anterior margin and sides of the thorx are also white.) Two snow-white fasciæ, one at about the basal one-fourth, the other about the middle, both strongly dark margined behind, and sometimes slightly so interiorly; and both strongly angulated posteriorly near the costa; with the first sometimes slightly interrupted at the angle, and the dark margin of the second posteriorly produced. A long oblique snow-white dorsal streak at the base of the dorsal cilia posteriorly dark margined, and a smaller costal one a little behind it at the base of the costal cilia, similarly dark margined. This dorsal streak is sometimes posteriorly produced, and confluent with a straight dorso-apical streak, which is faintly dark margined behind, but is sometimes entirely wanting. When present it forms the interior border to the apical dusting. Sometimes the costal streak is produced so as to be confluent with it also, and opposite to it there is sometimes a costo-apical white spot which is separated from it by the apical dusting, which extends thence to the apex and is black upon a white ground. Hinder marginal line in the cilia dark brown. Cilia golden. Alar expanse one-fourth to one-third inch."

The species, of which the above is the original description, is common in the eastern United States.

The larvæ form large blotch mines on the upper surface of leaves of white oak, *Quercus alba* L. One mine will often contain from several to a dozen larvæ. The loosened epidermis is brownish yellow, somewhat puckered, and often covering nearly the entire leaf.

Lithocolletis hamadryadella Clemens.

Plate XXIII, Fig. 13.

Lithocolletis hamadryadella Clemens, Proc. Acad. Nat. Sci. Phil., 324, 1859.—Tin. No. Am., 65, 77, 1872.—Chambers, Can. Ent., iii, 55, 164, 182, 1871.—Cin. Quart. Jn. Sci., i, 201, 1875; ii, 104, 1875.—Frey and Boll. Stett. ent. Zeit., xxxix, 262, 1878.—Busck, Proc. Ent. Soc. Wash., v, 190, 1903.—*hamadryella* Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6334.

Syn. *alternatella* Zeller, Verh. zool.-bot. Ges. Wien., xxv, 351, 1875.—*alternata* Chambers, Bull. Geol. Surv. Terr., iv, 153, 1878.

Antennæ white, with dark annulations; face and tuft white, the latter mixed with gray. Thorax white, sometimes sparsely sprinkled with gray. Forewings white, with two angulated, shining, ocherous fasciæ; the first just before the

basal third and margined internally with dispersed blackish scales, sometimes interrupting it in the middle; the second just behind the middle and margined internally with dispersed scales which are produced in the middle, dividing it into two parts. In the space between the fasciæ are a few scattered ocherous scales and an irregular line of blackish scales through the middle. Near the apex is a costal and a dorsal ocherous patch, sometimes meeting, with the space between them and the second fascia more or less marked with a line of irregular dusting, and separated from each other by a more or less dense cloud of dusting, sometimes connected with the produced margining of the second fascia. Apical portion white, mixed with ocherous, and densely dusted with black scales connected with the line separating the costal and dorsal ocherous patches. Basal third of the wing more or less dusted with black and marked with ocherous; a small patch of black scales on the costa near the base, followed by a black dusting sometimes arranged into two irregular bands upon an ocherous ground, of which the more basal one is the broader. Hinder marginal line of blackish scales. Cilia tinged with saffron. Expanse 6.5–8.5 mm., the usual size about 8 mm.

Hindwings and cilia gray, the latter tinged with fulvous. Abdomen gray, with ocherous anal tuft. Legs white, tibiæ and tarsi spotted with black.

Very common throughout the Atlantic States. The larva, which is of the flat type, forms an irregular whitish blotch mine on the upperside of oak, most commonly upon *Quercus alba* L. While the species is usually confined to oak as the food plant, I have specimens bred from *Magnolia* (District of Columbia) and *Ostrya Virginiana* (Cincinnati), which cannot be separated from those on oak.

Lithocolletis umbellulariæ Walsingham.

Plate XXIII, Fig. 14.

Lithocolletis umbellulariæ Walsingham, Ins. Life, ii, 78, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6290.

"Antennæ white, evenly dotted with brown along their upper sides, the five brown spots towards the apex being larger and more widely separated than the others. Palpi shining white. Face shining white, frontal tuft yellowish in the middle, saffron brown at the sides. Thorax golden saffron, whitish behind.

"Forewings golden saffron, somewhat shining, a short white patch at the base of the dorsal margin reaches to the fold and is exteriorly dark margined, the dark margin of a somewhat similar white spot on the costal portion of the wing, also reaches to the opposite side of the fold a little beyond it; at one-fourth the wing length is a waved white fascia running nearly straight from the dorsal margin to the fold, and bulging outwards beneath the costa; this is distinctly dark margined externally throughout and briefly so internally; immediately adjoining the costal margin at half the wing length is a broad, very oblique, white costal streak dark margined on both sides and freely dusted with blackish scales around the apex; the black dusting is continued along the outer side of an opposite less oblique dorsal streak, the apex of which reaches as far as the edge of the costal streak above it; at three-fourths the wing length is a white costal spot slightly margined with blackish atoms, and opposite to this is another

white dorsal streak, very oblique, externally margined at the apex with dusky atoms, which are continued so as to form a large patch of blackish dusting, at the apex of the wing, on the upper side of which patch lies a sickle-shaped white costal streak, concave towards the costal margin; cilia pale saffron, with a brown line running through the middle and reaching around the apex nearly to the anal angle, where they become paler, inclining to grayish.

"Hindwings and cilia pale grayish. Abdomen dark gray above, grayish white beneath; anal tuft yellowish. Hind tibiæ white, with two broadish black bars across their upper sides, and a small black terminal spot. Expanse 9 mm.

"Mendocino County, Cal., found and bred in the month of June, 1871. Three specimens, from large diffused blister-like mines on the upperside of leaves of *Umbellularia californica* Nuttal; the pupa being inclosed in a semi-transparent flat oval silken web, within the mine, like that of *cincinnatiella* Chamb., to which species it is somewhat allied. Its nearest ally in America is probably *macrocarpella* Frey and Boll, but it differs in the possession of a dark margined costa basal spot and in the comparatively straight first fascia." These characters also serve to separate it from *cincinnatiella* Chamb."

The above is Lord Walsingham's description.

Lithocolletis agrifoliella Braun.

Plate XXIII, Fig. 15.

Lithocolletis agrifoliella Braun, Ent. News, xix, 105, 1908.

Antennæ pale ocherous, spotted with brown above, the last five spots more widely separated. Palpi yellowish white, dark brown externally. Face yellowish white. Tuft yellowish in the middle, brown at the sides. Thorax reddish ocherous, with a few dark scales on the patagia.

Forewings reddish ocherous, somewhat shining. At the basal fourth is a perpendicular white dorsal streak dark margined externally, and reaching to the fold. A little farther back is a nearly perpendicularly placed white costal streak, convex outwardly beneath the costa and also attaining the fold slightly beyond the dorsal streak; it is strongly dark margined externally; its short internal straight dark margin is opposite the external dark margin of the first dorsal streak. Near the base the costal portion of the wing is of a smoky hue. Placed diagonally across the wing toward the base on a line with the internal edging of the first costal streak are two black transverse spots, the first just above the fold, and the second nearer the base just below the fold; sometimes with a few whitish scales internally. At about the middle of the wing length is a broad oblique costal streak, internally dark margined near the costa, and its external dark dusting continued as the external dusting of a much narrower dorsal streak, whose apex just meets that of the costal. At the angle the dusting is very dense on a white ground and is continued backward as a broad band, nearly one-half the breadth of the wing, to a point between the third costal and dorsal streaks. The third costal streak, which is sometimes a spot, not touching the costa, is inwardly oblique, and externally dark margined. Opposite it is a long oblique

dorsal streak, whose external dark margin is continued into the dusted apex, and which usually unites with a sickle-shaped costal streak lying above the dusted apex, and concave toward the costa. The dark margin of the third costal streak is sometimes continued along the costa to this last streak. Cilia ocherous, with a dark brown hinder marginal line through their middle. Alar expanse 7.5–9 mm.

Hindwings gray, with a bluish metallic lustre. Cilia fulvous. Abdomen dark bluish metallic above in the male, pale yellowish beneath, with a median line and diagonal marks on each segment dark. In the female with the last two or three segments and tuft ocherous, pale ocherous beneath and marked as in the male. Legs whitish, the first two pair annulate with black; hind tibiæ shaded with ocherous and black scales, tarsi tipped with black.

Mills College, Alameda County, California.

Described from specimens bred from leaves of *Quercus agrifolia* Nee. received from Mr. G. R. Pilate. The mine is a whitish, somewhat irregular blotch on the upperside of the leaf. The pupa is formed under a flat nearly circular semi-transparent web, the upper epidermis, as is usual, being thrown into a longitudinal fold.

This species is very near to *umbellulariæ* Wlsm. The most marked difference is the absence of the costal and dorsal basal white patches characteristic of that species.

Lithocolletis conglomeratella Zeller.

Plate XXIII, Fig. 16.

Lithocolletis conglomeratella Zeller, Verh. zool.-bot. Ges. Wien., xxv, 346, 1875.—Walsingham, Ins. Life, ii, 24, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6295.

Syn. *bicolorella* Chambers, Bull. Geol. Surv. Terr., iv, 103, 1878.—*obtusilobæ* Frey and Boll, Stett. ent. Zeit., xxxix, 265, 1878.

Thorax saffron yellow; head lighter, with whitish face and palpi. Antennæ closely annulate with brown, annulations obsolete toward the base. Fore and middle tarsi white, spotted with black; hind tarsi pure white. Of the size of an average *quercifoliella*. Forewings dull saffron yellow. On the costa there are two very short oblique streaks and a dot, at one-third, one-half and two-thirds the wing length, all three of a lustreless white color. The two former are externally blackish margined, the second being the longer and dusted around its apex with black scales. A narrow white line extends along the dorsal margin, becoming less distinct opposite the first costal streak, beyond which it is almost obsolete, until it reaches a place between the second costal streak and the costal spot, where it is broadened and deflexed, and extends as the inner margin of the black apical dusting, nearly to the apex of the wing in an outwardly convex line becoming narrower. Such is the case in but one specimen; in the second it stops entirely after the broadening, which makes a short streak, and as an indication of its continuation, there is an indistinct dot above the dusting, somewhat behind the costal streak. Toward the dorsal cilia and partly on them is a broad trans-

verse streak, made up of a cloud of black dusting, narrowly separated from the dusting of the second costal streak. Cilia yellowish gray, yellowish around the dusted portion, and without lustre.

Hindwings gray, their cilia lighter. None of the markings reappear upon the underside of the forewings.

In addition to the above description, Zeller has noted another form of this variable species, in which the dusting, especially that in the apical portion, is much less dense.

Very widely distributed, occurring from New Jersey to Ohio, southward and westward to Texas and California.

The larvæ form blotch mines on the upper side of leaves of various species of oak. The pupa is formed under a flat, nearly circular silken cocoon. I have a series bred from live oak, *Quercus Virginiana* Mill. from Fortress Monroe, Va., showing all intergrades between specimens having the deflexed dorso-basal streak extending unbroken nearly to the costa, and those in which it is nearly overlaid with black dusting. The figure represents a specimen of the former variety. There is a median white streak on the thorax not mentioned in the description. The character "hind tarsi pure white" is by no means constant or reliable, as several specimens have the first tarsal joint very distinctly tipped with black.

A series in the National Museum, bred by Mr. Busck on live oak from Willis, Texas, is darker, more densely dusted, and has the antennal joints very distinctly annulate all the way to the base.

Alar expanse 7.5–9 mm.

Lithocolletis ulmella Chambers.

Plate XXIII, Fig. 17.

Lithocolletis ulmella Chambers, Can. Ent., iii, 148, 1871.—Cin. Quart. Jn. Sci., i, 202, 1874; ii, 101, 1875.—Frey and Boll, Stett. ent. Zeit. xxxiv, 214, 1873.—Walsingham, Ins. Life, ii, 24, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6294.

Syn. *modesta* Frey and Boll, Stett. ent. Zeit., xxxvii, 224, 1876; xxxix, 274, 1878.

"Face and palpi silvery white, tuft white, intermixed with golden. Antennæ silvery white, the apical two-thirds annulate with brownish. Legs and under surface silvery white. Anterior wings bright golden, inclining to orange, with a white streak along the dorsal margin from the base to the cilia, where it is deflexed and passes on to the dusted portion of the apex which is near the posterior margin, and is dark brown on a white ground. There are three small costal silvery streaks, the first and second being near the middle of the costal margin, and the second one the largest, while the third is small and near the apex. There is some variation in the size of the third costal streak and in the extent of

the apical dusting, and sometimes the costal streaks are faintly dark margined. The abdomen and legs are very pale golden varied with white. Alar expanse one-fourth to nearly one-third inch."

The larvæ form irregular blotch mines on the upper side of leaves of elms, *Ulmus fulva* Michx. and *Ulmus Americana* L. The pupa of the summer brood is formed under a flat silken cocoon. A later hibernating brood changes from the usual green color to a pale yellow color, and passes the winter in silk lined chambers.

The expanse of the imago does not vary as greatly as would appear from Mr. Chambers' measurements, being 6.5–7 mm. The original description, printed above, is accurate in all other details, except that the second costal streak is often more than "faintly dark margined" behind.

Although resembling *L. conglomeratella* Zell. very closely, it may be distinguished from it by the uniformly smaller size, paler ground color of the wings, slightly more oblique position of the costal streaks, the absence of the tuft of scales in the apical cilia and especially by the antennæ. In *ulmella* the apical two-thirds only are annulate with brown, while in *conglomeratella* the annulations are always present for the whole length, although sometimes indistinct toward the base.

Lithocolletis quercivorella Chambers.

Plate XXIII, Fig. 18.

Lithocolletis quercivorella Chambers, Can. Ent., xi, 145, 1879.—Walsingham, Ins. Life, ii, 24, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6296.

Face, palpi, tuft and antennæ silvery white; sides of the tuft reddish orange; each joint of the antennæ spotted above with dark brown, the spots becoming small and indistinct toward the base. Thorax and forewings golden; a median white streak on the thorax is continuous with a dorso-basal white streak on the forewing, which extends slightly beyond the middle of the dorsal margin. Its end is usually bordered with two or three fuscous scales. There are three costal white streaks, of which the first two are oblique. The first at one-third is dark margined behind and sometimes on the costa before; the second at the middle of the wing length is dark margined behind and around the tip, and the dark scales are produced backward for a short distance. The third is a spot before the cilia dark margined on both sides. Opposite this is an oblique dorsal streak densely margined with blackish scales behind, the dark margin passing into the dusted apical part of the wing. Cilia silvery ocherous; hinder marginal line dark brown. Expanse 6.5–7 mm.

Hindwings silvery ocherous, cilia concolorous. Abdomen pale yellow. Legs whitish, shaded with ocherous. In the original description Mr. Chambers says "tarsi annulate with black." The fore and middle tarsi are always annulate with black, but more often the hind tarsi are silvery white.

The species occurs probably throughout the entire eastern half of the United States upon various species of oak. The mine is a flat blotch upon the upperside of the leaf, similar to that of *L. conglomeratella* Zell.

Quercivorella is closely related to *ulmella* and *conglomeratella* but may be distinguished from both by the fact that the dorso basal white streak extends only a short distance beyond the middle. The dorsal margin is of the ground color from here to the oblique streak, which occupies the same position as the deflexed portion of the dorso-basal streak in *conglomeratella* and *ulmella*.

Lithocolletis mediodorsella sp. nov.

Plate XXIII, Fig. 19.

Antennæ whitish, spotted above with brown. Face and palpi white. Tuft whitish, ocherous toward the sides.

Thorax and forewings reddish ocherous. At the basal third is an oblique white costal streak, black margined externally. A broad white stripe through the middle of the thorax is continuous with a dorso-basal white stripe extending to beyond the middle of the dorsal margin. From its end a white dorsal streak extends obliquely upward uniting in the middle of the wing with a similar costal streak to form a somewhat interrupted angulated fascia of which the external dark dusting at the angle is produced backwards on a white ground for a short distance. At the apical third is a white costal spot, with a few dark scales externally, and opposite it is a long, oblique dorsal streak, dark margined externally and uniting with a curved streak, concave toward the costa, which often extends through the cilia, and forms the internal border to the dusting of the apex, which is black upon a white ground. Cilia ocherous, becoming gray toward the tornus, with a dark ocherous line through their middle. Expanse 7-8.5 mm.

Hindwings and cilia grayish ocherous. Abdomen grayish ocherous, with pale anal tuft. Legs whitish, shaded with brown; hind tarsi very faintly tipped with black.

Type.—No. 12006, U. S. N. M.

Sonoma County, California. Described from two specimens, one bred on oak by Mr. A. Koebele, the other collected by Lord Walsingham, May 22-23, 1871.

Closely related to *quercivorella* Cham., from which it differs, however, by the presence of the oblique dorsal streak at the end of the dorso-basal streak. It is also of somewhat greater expanse.

Lithocolletis australisella Chambers.

Plate XXIII, Fig. 20.

Lithocolletis australisella Chambers, Bull. Geol. Surv. Terr., iv, 103, 1878.—Dyar, Bull. 52, U. S. Nat. Mus. 1902, No. 6297.

"No basal streak nor apical spot on the forewings, which are pale golden (about the color of *L. argentinotella* Clem.). There is no distinct hinder marginal line in the pale yellow cilia. The marks on the wings are: first, a small, white, dorsal streak; then an oblique, white costal streak about the basal third of the wing length; a silvery white fascia about the middle, which is posteriorly angulated nearer to the costal than to the dorsal margin; a small, silvery white costal spot, immediately before the cilia, and a longer dorsal one opposite to it, extending obliquely backward; all of these marks are posteriorly dark margined, the dark margin of the last costal and dorsal streaks almost meeting in the apical part of the wing; apex dusted with dark brown on a white ground. Thorax pale golden, with a white streak from its anterior margin to the apex. Head, tuft, palpi and antennæ silvery white, each joint of the antennæ dotted above with brown, and the basal joint pale golden above. Under surface of body, wings, and legs pale luteous, the legs stained with brownish on their anterior surfaces. Alar expansion three lines and one-half. Bosque County, Texas."

The above is Chambers' original description of the species.

Lithocolletis chambersella Walsingham.

Plate XXIII, Fig. 21.

Lithocolletis chambersella Walsingham, Ins. Life, ii, 78, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6300.

Syn. *quinquenotella* Chambers (not Frey), Jn. Cin. Soc. Nat. Hist., ii, 189, 1880.

"Face, palpi and antennæ silvery white, the antennæ faintly stained with fuscous. Vertex, thorax and forewings yellowish saffron (less golden than *argentinotella* Clem.). Forewings with four silvery costal streaks, the first two oblique, and the others perpendicular to the margin, and the last passing into the white ground color of the apex, which is densely dusted with fuscous; none of the costal streaks are dark margined. Opposite to the apex of the first costal streak begins a long, oblique dorsal streak, which, behind the middle of the wing length, becomes confluent with the second costal streak, and is strongly dark margined behind. There is no basal streak, apical spot, or hinder marginal line. Legs silvery white; but the first pair of tarsi are marked on their anterior surfaces with fuscous spots. Abdomen silvery white, stained with pale lead color beneath. Alar expanse a little over one-fourth inch. Texas."

The above is Mr. Chambers' description.

Lithocolletis cervina Walsingham.

Plate XXIII, Fig. 22.

Lithocolletis cervina Walsingham, Proc. U. S. Nat. Mus., xxxiii, 221, 1907.

"Antennæ whitish. Palpi white. Head pale rust-brown; face white.

"Forewings whitish fawn, with very indistinct whitish costal streaklets; the first, before the middle, oblique, outwardly margined with rust brown; the second, at about the middle, also outwardly margined with rust-brown, runs obliquely outward and is angulated on the cell, returning to the middle of the dorsum, its lower half longer and more oblique than its upper; the third costal streak in triangular, not oblique, also outwardly margined with rust-brown, which is continued across the wing to the tornus, where there is also a faint indication of a whitish spot; there is no basal streak, and, except for a slightly paler space before the line of dark scales on the middle of the dorsum, no defined

dorsal streak; the space between the streaks and about the apical portion of the wing is slightly shaded with rust-brown, and the apex is profusely sprinkled with blackish scales mixed with some white ones; a slender blackish line runs around the extreme apex at the base of the pale cilia, which have a pale rust-brown line running through their middle. Alar expanse 6 mm.

"Hindwings and cilia grayish. Abdomen grayish. Legs whitish, unspotted."

Lord Walsingham described the species from a specimen from New York in the Beutenmüller collection.

Lithocolletis platanoidiella Braun.

Plate XXIII, Fig. 23.

Lithocolletis platanoidiella Braun, Ent. News, xix, 106, 1908.

Antennæ whitish, banded with brown above. Palpi shining white. Face shining white, with a slight golden lustre. Tuft golden.

Thorax and forewings deep shining ocherous. Extreme edge of the costa towards the base black. The first costal streak at the basal fourth short, oblique and outwardly dark margined. The second costal streak at the middle of the wing length is also oblique, and its apex meets that of the longer corresponding dorsal streak, which begins at the middle of the dorsal margin, somewhat nearer the base than the costal streak. There is thus formed an interrupted, angulated white fascia, of which the external dark dusting is continuous, and is prolonged backward to the space between the third costal and the second dorsal streaks. These latter streaks are placed opposite to each other, the costal at the apical third, the dorsal at the tornus, and both are dark margined behind. Fourth costal streak somewhat oblique, pointing forwards, and dark margined behind by a few black scales. Apical portion white, dusted with black scales. This dusted portion forms an almost rectangular area. At the base of the costal cilia, but not extending through them, and anterior to the dusted apex, is a small white streak. Marginal line in the cilia brown. Cilia ocherous around the apex, becoming gray towards the tornus. Alar expanse 6.5-8 mm.

Hindwings gray. Cilia gray, tinged with reddish. Abdomen gray above, shining silvery ocherous beneath. Anal tuft ocherous. Front legs dark brown above, with a narrow white stripe beneath. Tarsi white at their bases. Middle and hind legs whitish ocherous, their tarsi tipped with black.

I have bred this species at Cincinnati, Ohio, from blotch mines on the upper surface of leaves of several species of oak, viz.: *Quercus alba* L., *Quercus macrocarpa* Michx., *Quercus platanoides* (Lam.). The larva is of the flat type, and when mature spins an oval flat cocoon. The imagoes appear in August. The larvæ of the fall brood hibernate in silken lined chambers. There is a specimen in the U. S. Nat. Mus. from New York (Beutenmüller collection).

This species superficially resembles *L. bethunella* Cham., from which it can be distinguished by the absence of the dorsal streak at the basal fourth, and by the presence of two costal streaks beyond the fascia, there being but one such streak in *L. bethunella*.

Lithocolletis fletcherella sp. nov.

Plate XXIII, Fig. 24.

Antennæ whitish, banded above with brown. Face white; palpi white internally, dark externally. Tuft ocherous, whitish in the middle.

Thorax and forewings reddish ocherous. Four white costal and three white dorsal streaks, all margined with dark brown externally. First costal and dorsal streaks oblique, the costal at the basal third, the dorsal a little nearer the base, and extending slightly beyond the fold; its pointed apex is directed toward that of the first costal streak. Second pair of streaks at the middle almost parallel to the first pair, meeting to form a more or less interrupted angulated fascia, of which the dark margin is continuous. Third pair of streaks at the apical third, perpendicular and almost meeting in the middle of the wing. Fourth costal streak curved, almost inclosing the more or less dusted apex. In the male, on the middle of the wing, half way between the third pair of streaks and the fourth costal streak, is a white spot, with a few dark scales behind it. Cilia ocherous. Expanse 8.5–9 mm.

Hindwings and cilia grayish ocherous. Abdomen ocherous gray, tuft ocherous. Legs ocherous, hind tarsi pure white.

Described from specimens sent to me by Dr. Fletcher from the Central Experimental Farm, Ottawa, Canada, where they were bred from white oak by Mr. Arthur Gibson.

Lithocolletis arcuella Braun.

Plate XXIV, Fig. 1.

Lithocolletis arcuella Braun, Ent. News, xix, 107, 1908.

Antennæ whitish, annulate with brown above, tips blackish. Palpi silvery white. Face silvery white, slightly tinged with golden. Tuft yellow, mixed with orange at the sides.

Thorax and forewing shining reddish orange, with glistening white markings. There are three costal and three dorsal white spots, the second pair uniting to form a fascia; all black margined externally. The first costal spot at the basal third is short and broad, its dark margin passing around its apex almost encloses it. The first dorsal, almost square, begins nearer the base than the first costal, and extends half way across the wing. A broad white angulated fascia at about the middle, black margined externally, and on the costa internally. Third costal streak strongly arcuate and opposite the more triangular dorsal streak; the external dusting densest immediately behind their apices. Apical portion densely dusted with blackish brown scales, and bordered internally by an indistinct outwardly concave streak of silvery scales. Marginal line in cilia brownish. Cilia golden, becoming grayish toward the tornus. Alar expanse 10 mm.

Hindwings bronzy gray, cilia gray. Abdomen bronzy gray above, silvery beneath. Anal tuft reddish. Legs, except the first pair, ocherous; tarsi whitish and unspotted. First pair striped with dark gray, tarsi banded with gray.

One specimen taken at Mountain Lake, Giles County, Virginia, June 20, 1907. A very large and distinctly marked species, belonging to the same group as *L. bethunella* Cham.

Lithocolletis betulivora Walsingham.

Plate XXIV, Fig. 2.

Lithocolletis betulivora Walsingham, Ins. Life, iii, 326, 1891.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6328.

"Antennæ grayish above, white beneath. Palpi white. Head and face white, crown tufted with reddish saffron. Thorax reddish saffron.

"Forewings shining reddish saffron, no basal streak, a small costal spot at one-fourth the wing length and a small dorsal spot nearer to the base dull white, a slender fascia at the middle of the wing angulated outwardly near the costal margin, has one or two black scales on its outer edge; beyond this a small costal streak and an opposite dorsal streak, both dull white, with a few blackish scales on their outer edges. A group of black scales at the apex of the wing is preceded on the costal and dorsal margins by dull white, not sufficiently conspicuous to be called costal and dorsal streaks; cilia grayish, their bases tinged with saffron, a slender blackish line along their middle, passing round the apex.

"Hindwings dark gray; cilia gray. Abdomen gray, tinged with saffron posteriorly. Hind legs whitish, with a very faint indication of darker scaling on the penultimate tarsal joint. Expanse 7 mm."

Lord Walsingham has thus described the species from a female specimen bred from birch by Dr. Riley.

The mine is a small, sometimes almost circular, blotch upon the upper side of the leaf.

There is a specimen of this species in the U. S. Nat. Mus. bred from birch, but no locality is given.

Lithocolletis eppelsheimii Frey and Boll.

Lithocolletis eppelsheimii Frey and Boll, Stett. ent. Zeit., xxxix, 272, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6325.

Face and palpi snow-white; tuft saffron yellow. The antennæ whitish gray, annulate with brown, attain an unusual length. They fully equal the length of the forewings. Thorax saffron; legs whitish, with unspotted tarsi. Abdomen dark gray, light underneath.

The moderately shining forewings have a true saffron color. They show the following shining silvery white markings; on the costa at one-third of the wing length there is a rather small, obliquely placed costal streak, imperfectly margined toward the base with a few black scales. The corresponding dorsal streak is short, blunt, not well developed, placed at the basal fourth of the wing length, and is externally more strongly margined with blackish scales. Then follows, about in the middle of the wing, an angulated, interrupted fascia, inwardly blackish margined, and with a shorter costal and a longer dorsal arm. At three-quarters of the wing length is a pair of streaks, the dorsal placed at the hind angle. The trace of a last costal streak appears just before the apex. The black dusting extends in considerable breadth from the above-mentioned pair of streaks to the hind margin, either in the shape of a broad spot, or to the unaided eye as a dot suddenly ending. Base of the cilia saffron, tips whitish gray. At the hind angle they become entirely of a uniform light gray.

Hindwings and cilia gray. The underside of the forewings dark ocherous gray.

The description given above is a translation of that by Frey and Boll, and appears to be somewhat inconsistent in several details. While it seems to belong to the flat group of larvæ, the internal dark margin of the fascia, if the description is correct, is an anomaly in the group. I have seen no specimen of the species, and it is impossible to determine its position with certainty. It was described from specimens bred from upperside mines on a species of *Carya* in Texas, and is one of the smaller species.

Lithocolletis bethunella Chambers.

Plate XXIV, Fig. 3.

Lithocolletis bethunella Chambers, Can. Ent., iii, 109, 1871.—Cin. Quart. Jn. Sci., ii, 103, 1875.—Can. Ent., xi, 89, 1879.—*bethuniella* Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6326.

Syn. *lebertella* Frey and Boll, Stett. ent. Zeit., xxxix, 266, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., No. 6327.

"Face and palpi silvery white; antennæ silvery white beneath, brownish banded with white above; tuft golden, interspersed with white; thorax and anterior wings reddish orange, with three costal and three dorsal silvery streaks, all dark margined externally. First costal and first dorsal small, the dorsal being the largest and nearer to the base, whilst the costal is a little oblique and at about the basal one-third of the wing. The second dorsal and second costal about the middle, opposite each other, and a little oblique, the dorsal being the longest, and almost meeting the costal near the costa, whilst their dark margins do meet and are posteriorly angulated and produced to the space between the third dorsal and third costal. The third dorsal and third costal are a little behind the apical one-third, opposite, straight, and the dorsal is the longest. Apex dusted with blackish on a white ground. Cilia fulvous, with a dark brown hinder marginal line at their base. Al. ex. a little over one-fourth inch."

The above is Chambers' original description. As noted by Chambers, the opposite costal and dorsal streaks (except the first pair) are sometimes confluent, forming fasciæ. There is also, just before the apical black dusting, a small white spot, which does not extend through the cilia. Alar expanse 6.5–7.5 mm.

The larvæ, of the flat type, form oval blotch mines on the upper side of several species of oak, and spin flat, oval, silken cocoons. The species occurs in the eastern half of the United States, west and south to Texas.

The description of *lebertella* Frey and Boll in no way differs from that of *bethunella*, and their life history is identical. The synonomy, as above given, will doubtless stand, although there has been no opportunity of comparing specimens of *bethunella* with the type of *lebertella* in England.

Lithocolletis fasciella Walsingham.

Plate XXIV, Fig. 4.

Lithocolletis fasciella Walsingham, Ins. Life, iii, 326, 1891.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6317.

Syn. *unifasciella* Chambers (not Tengström), Cin. Quart. Jn. Sci., ii, 103, 1875.

Antennæ gray, banded with dark brown above. Face and palpi whitish, with a faint ocherous tinge. Tuft reddish orange, paler in the center.

Thorax and forewings reddish orange. Near the middle of the wing is an obtusely angulated silvery fascia, margined on the costa before with a brown spot, and strongly dark margined behind. This dark margin is produced backward along the costa, and as a broad band along the middle of the wing. These two streaks of dusting are connected at the beginning of the cilia, and are also sometimes confluent with the apical dusting, which is dark brown on a paler ground, and extends to the tornus. No costal nor dorsal streaks. A dark brown line runs through the middle of the cilia, which are brownish ocherous, becoming gray at the tornus. Expanse 6–7 mm.

Hindwings and cilia gray, with a slightly reddish tinge. Abdomen gray. Hind tarsi tipped with black.

The oval blotch mines are found upon the upperside of various species of oak. Ohio and Kentucky.

Lithocolletis castaneæella Chambers.

Plate XXIV, Fig. 5.

Lithocolletis castaneæella Chambers, Cin. Quart. Jn. Sci., ii, 104, 1875.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6318.

Syn. *castanella* Walsingham, Ins. Life, iii, 329, 1891.

Antennæ gray, banded above with dark brown. Face and palpi tinged with ocherous. Tuft reddish orange, paler in the middle.

Thorax and forewings reddish orange. At the basal third is a small white spot, margined behind with black scales. At the middle of the wing is an obtusely angulated, nearly straight fascia, dark margined behind and sometimes on the costa before. At the angle of the fascia the dusting is produced backward along the middle of the wing, uniting with that which forms the external margin of a white costal streak at the beginning of the cilia. Opposite this streak the position of a dorsal streak is faintly indicated. A small, white spot just before the dusted apex. Sometimes the dusting behind the fascia and at the apex is almost entirely lacking. A dark line through the middle of the cilia, which are brownish ocherous, shading to gray at the tornus. Expanse 6-7.5 mm.

Hindwings and cilia gray, the latter with a reddish tinge. Abdomen dark gray. Hind tarsi tipped with black.

Ohio and Kentucky.

The mine occurs upon the upperside of leaves of chestnut and various species of oak, and is a somewhat oval blotch. In this species the larva hibernates on a slight bed of silk beneath the folded epidermis.

Lithocolletis guttifinitella Clemens.

Plate XXIV, Fig. 6.

Lithocolletis guttifinitella Clemens, Proc. Acad. Nat. Sci. Phil., 324, 1859.—Tin. No. Am., 65, 76, 1872.—Chambers, Can. Ent., iii, 110, 1871.—Cin. Quart. Jn. Sci., i, 201, 1874.—Bull. Geol. Surv. Terr., iv, 102, 1878.—Jn. Cin. Soc. Nat. Hist., ii, 82, 1879.—Busck, Proc. Ent. Soc. Wash., v, 189, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902. No. 6306.

Syn. *toxicodendri* Frey and Boll, Stett. ent. Zeit., xxxix, 273, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6304.

"Front silvery, with a reddish hue. Tuft and thorax reddish orange. Antennæ blackish brown. Forewings rather deep reddish orange, with two silvery bands black margined behind, one in the middle of the wing and nearly straight, the other midway between this and the base of the wing and obliquely placed. Before the costo-apical cilia is a costal silvery spot, black margined on both sides, with an opposite dorsal spot, black margined behind. The apical portion of the wing is dusted with blackish, dispersed scales, with a white spot near the tip above the middle of the wing. There are two hinder marginal lines, one the margin of the dispersed scales, the other dark brownish in the cilia.

"The larva may be taken in August and September in the leaf of *Rhus toxicodendron* (poison oak), mining the upper surface in a rather broad, tortuous tract, and there are ordinarily several in the same leaf. The larva belongs to the second larval group. The head is a fine pale brown; the body yellowish posteriorly, becoming brownish above, with dorsal and ventral dark maculæ. The cocoon is circular, formed within the mine as usual in this group in a little circular depression."

The above is Clemens' description of imago and larva. Mr. August Busck (Proc. Ent. Soc. Wash., v, 189, 1903) has established the synonomy of this species with *Lithocolletis toxicodendri* Frey and Boll, and added important notes upon the variability of the species. The expanse is 7 mm.

Lithocolletis obstrictella Clemens.

Plate XXIV, Fig. 7.

Lithocolletis obstrictella Clemens, Proc. Acad. Nat. Sci. Phil., 322, 1859.—Tin. No. Am., 64, 73, 1872.—Chambers, Can. Ent., iii, 183, 1871.—Bull. Geol. Surv. Terr., iv, 102, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6307.

Syn. *bifasciella* Chambers, Bull. Geol. Surv. Terr., iv, 101, 119, 153, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6329.—*ceriferæ* Walsingham, Proc. U. S. Nat. Mus., xxxiii, 222, 1907.

Face and palpi whitish, face tinged with reddish orange, deeper towards the vertex. Antennæ silvery gray beneath, dark gray above, with a lighter joint near the apex.

Thorax and forewings shining reddish brown. Forewings with silvery markings dark margined externally. At the basal fourth is a silvery fascia, nearer

the base on the dorsal margin, and very indistinctly angulated near the costa. At the middle of the wing length is a straight perpendicular fascia. At two-thirds are a pair of opposite silvery streaks, often uniting in the middle of the wing to form a third fascia. Apex overlaid with velvety blackish brown scales, with a few silvery scales before. Cilia reddish brown, shading to gray at the tornus, and with a dark brown line through the middle. Expanse 7–8 mm.

Hindwings and cilia blackish brown. Abdomen blackish brown in the female, gray in the male. Legs pale brownish gray, tarsi whitish, shaded with gray toward their bases.

New York (Beutenmüller collection), Pennsylvania, Ohio and Kentucky.

The external margining is in the males more distinct and of a clearer black than in the females, where it is often dark brown, scarcely darker than the ground color.

The upperside mines occur on several species of oak: *Quercus rubra* L., *Quercus alba* L., *Quercus acuminata* (Michx.) Sarg. The mine is a rather broad Y-shaped tract, sometimes crossing the mid-rib. The flat, oval, silken cocoon is spun in the leg of the Y. Specimens bred from such mines are in every respect identical with Clemens' type of *obstrictella*. Dr. Clemens was certainly in error when he described the mine of *obstrictella* as a mine on the under-side of oak leaves. The imago of this species is typically that of the flat larval group.

Obstrictella may be distinguished from all other allied eastern species by the character of the black scales which form the apical dusting. These scales are more freely tipped with black than is usual in the case of the scales forming the apical dusting of the flat group, and hence the effect is a large black spot rather than a number of small dots. The silvery scales before the apex are also characteristic of the species.

Chambers' type of *bifasciella* is identical with Clemens' type of *obstrictella*; on one wing the third fascia is nearly complete.

The specimen from which Lord Walsingham described *cerifera* is identical with the series of specimens of *obstrictella* from the Beutenmüller collection in the U. S. Nat. Mus. All of this series bear the breeding record number 114 (blotch mine on the upperside of red and white oaks). The type of *cerifera* is the only specimen bearing on the pin the food plant label, "*Myrica cerifera*." This is certainly an error.

Lithocolletis corylisella Chambers.

Plate XXIV, Fig. 8.

Lithocolletis corylisella Chambers, Can. Ent., iii, 111, 127, 1871.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6308.

Syn. *coryliella* Chambers, Can. Ent., xi, 90, 1879.—*bifasciella* Walsingham, Proc. U. S. Nat. Mus., xxxiii, 223, 1907.

Face, palpi and antennæ white; antennæ annulate with brown above. Tuft ocherous.

Thorax and forewings reddish ocherous. A short white streak from the inner angle to the fold dark margined externally. Two white fasciæ dark margined externally; the first at about the basal fourth, oblique, nearer the base on the dorsum, and slightly convex above the fold. Second fascia at about the middle, nearly erect. At the apical fourth is a white costal streak, and opposite it a nearly erect dorsal streak above the cilia; both are dark margined externally. In the apical portion of the wing is an oblique white streak, not extending through the costal cilia, dusted with fuscous scales behind and around its apex. This dusting is sometimes almost lacking. Hinder marginal line in the cilia brownish, indistinct. Cilia ocherous, grayish toward the tornus. Expanse 6.5-7 mm.

Hindwings and cilia grayish, tinged with ocherous. Abdomen gray. Legs whitish ocherous.

The blotch mines on the upperside of hazel, *Corylus Americana* Walt., are very similar to those of *ostryarella* Chamb. However, the silken chamber in which the larva hibernates is of the usual type, the epidermis not being raised in a circular ridge as in *ostryarella*.

The male specimen which Lord Walsingham described as *bifasciella* Cham. is one of the series from the Beutenmüller collection, bearing the record number 118, and bred on *Corylus*, and identical with specimens of *corylisella* Cham.

Lithocolletis æsculisella Chambers.

Plate XXIV, Fig. 9.

Lithocolletis æsculisella Chambers, Can. Ent., iii, 111, 1871.—Walsingham, Ins. Life, ii, 53, 1889.—Busck, Proc. Ent. Soc. Wash., v, 190, 1903.

Syn. *æsculella* Riley, Smith's List Lep. Bor. Am., 109, 1891.

Antennæ whitish, banded above with dark brown. Face and palpi white. Tuft ocherous, whitish behind. Thorax and forewings reddish ocherous. A whitish streak on each side of the thorax is continuous with a slightly paler shade on the forewings, from the inner angle to the fold. Two white posteriorly dark margined fasciæ. The second, at about the middle of the wing, indistinctly obtusely angled near the costa, with its dorsal arm nearer the base. The first fascia, half way between this and the base of the wing, is broken near the costa. Its dorsal arm is more oblique and diverges from the second fascia. At the beginning of the cilia is a small costal spot, and opposite it a longer almost perpendicular dorsal streak, both black margined behind. Apical black dusting more or less dense, and edged internally by an oblique white streak, sometimes

almost uniting with the dorsal streak. Cilia ocherous, with a slightly darker line through their middle. Expanse 8–9 mm.

Hindwings and cilia gray, with an ocherous tinge. Abdomen gray, tuft ocherous. Legs whitish ocherous. Hind tarsi white, with one or two joints faintly tipped with black.

Central United States. The mine occurs on the upperside of buckeye, *Æsculus glabra* Willd. and *Æsculus flava* Ait. It is a broad linear tract sometimes containing as many as five or six larvæ. The winter is passed in the larval state, the period of hibernation lasting from August until April of the following year.

Æsculisella may be distinguished from all allied species by the form of the first fascia, which is broken near the costa.

Lithocolletis ostryarella Chambers.

Plate XXIV, Fig. 10.

Lithocolletis ostryarella Chambers, Can. Ent., iii, 111, 1871.—Tin. No. Am., 72, 1872.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6335.

Face, palpi and antennæ white; antennæ annulate above with brown.

Thorax and forewings reddish ocherous. A white streak from the inner angle to the fold, faintly black margined externally. Two white fasciæ, the first beginning on the dorsum at about the basal fourth, concave outwardly on the fold, thence extending obliquely to the costa, which it reaches at about the basal third. It is black margined externally. The second fascia, at about the middle, is slightly oblique and black margined externally. At the apical fourth a costal white streak black margined externally. Opposite it above the cilia is a very oblique, long dorsal streak also black margined externally. Just before the apex an oblique white streak on the line of the last dorsal, and not extending through the cilia, is dusted behind with blackish scales. The scales in the apical third of the wing are tipped with brown. Hinder marginal line in the cilia brownish. Cilia ocherous, grayish toward the tornus. Expanse 6–7 mm.

Hindwings grayish ocherous. Cilia grayish, tinged with ocherous. Abdomen gray, tuft ocherous. Legs whitish ocherous, hind tarsi sometimes tipped with black.

The larvæ form irregular blotch mines on the upperside of *Ostrya Virginiana* (Mill.) Willd. and *Carpinus Caroliniana* Walt.; as many as four or five sometimes occurring in one mine. The hibernating larvæ pass the winter in circular silken-lined chambers, the outline appearing on the upper epidermis as a circular narrow ridge; a convex projection appears on the lower side.

The brownish dusting of the apical third of the wing is the distinguishing characteristic of *ostryarella*. *Corylisella* may also be distinguished from *ostryarella* by the dorsal streak above the cilia being nearly erect, while in *ostryarella* it is oblique and nearly parallel to the edge. The fasciæ, especially the first, are also less oblique in *corylisella*.

Lithocolletis aceriella Clemens.

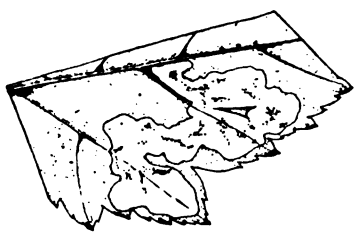
Plate XXIV, Fig. 11.

Lithocolletis aceriella Clemens, Proc. Acad. Nat. Sci. Phil., 325, 1859.—Tin. No. Am., 65, 75, 1872.—Busck, Proc. Ent. Soc. Wash., v, 189, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6305.

"Front silvery, tuft reddish orange and silvery mixed. Thorax reddish orange. Forewings reddish orange, somewhat metallic, with a white streak, black margined exteriorly, from the inner basal angle to the fold; with two oblique silvery bands, black margined behind, one about the middle of the wing and the other midway between it and the base of the wing. Near the tip is a costal silvery spot, black margined behind, with an opposite, oblique dorsal streak of the same hue, likewise black margined behind, and an oblique costal silvery streak continued on the line of the last dorsal, running into the cilia just before the tip, black margined above, at the tip before, and below at the tip behind; scarcely with a hinder marginal line, cilia of the general hue. Hindwings plumbeous, cilia with a fulvous hue.

"The larva mines the leaf of maple in September. It mines the upper surface of the leaf, making a flat, rather broad tract, casting its frass along the middle of the course of it. Physical characteristics those of the second larval group. Head pale brown; body yellowish green, with oval, dorsal, brown maculæ, darkest on their margins; thoracic rings on their sides pale yellowish. The cocoon is circular."

The above is Clemens' description and represents the typical eastern form of the species. Specimens occur in which the white streak at the base of the dorsal margin is replaced by a pale ocherous shade, bordered externally by brown scales. The dorsal streak above the cilia is also very variable, being in some specimens almost erect, while in others it is oblique and parallel to the termen. The usual expanse is about 7 mm., but specimens collected at Ottawa, Canada, by Mr. C. H. Young expand 8–9 mm. In these specimens the pale streak at the base of the wings is scarcely lighter than the ground color.



Mine of *L. aceriella.*

The mine is common throughout the Atlantic States on leaves of red maple, *Acer rubrum* L., but is rarely found upon sugar maple. The larvæ appearing in July pupate in a silken lined chamber, and do not spin the usual flat silken cocoon.

The insect to which Chambers refers in Can. Ent., iii, 130, 1871, is not *L. aceriella* Clem. but the species described under the name *saccharella* by the writer.

Lithocolletis hamameliella Busck.

Plate XXIV, Fig. 12.

Lithocolletis hamameliella Busck, Proc. Ent. Soc. Wash., v, 189, 1903.
Syn. *hamamelis* Smith's List Lep. Bor. Am., 1903, No. 6844.

Face and palpi whitish. Antennæ whitish ocherous, annulate with dark brown. Tuft reddish orange.

Thorax and forewings deep reddish orange. An oblique white streak from the inner angle to the fold is black margined externally. There are two straight, oblique, parallel, silvery bands black margined externally, the first at the basal fourth, and the second at the middle of the wing length. At the beginning of the costal cilia is a silvery spot, black margined externally. Opposite it is a long, very oblique dorsal streak, parallel to the termen, also black margined behind, and uniting in the apex of the wing with a short apical streak, dark margined at its apex and above and below. Marginal line in the cilia of the wing color. Cilia reddish, becoming gray at the tornus. Expanse 7 mm.

Hindwings and cilia reddish gray. Abdomen dark gray above, ocherous gray beneath. Legs pale brownish red, tarsal joints white, tipped with black.

This species is distributed throughout the Atlantic States wherever the food plant, *Hamamelis Virginiana* L. (witch hazel), occurs. The mine is a whitish blotch, sometimes almost circular; the pupa of the summer brood is formed beneath a flat silken cocoon.

Although it is very closely related to *aceriella*, it may be separated from that species by the deeper and more reddish color of the tuft and wings, and by the more distinct marginal line in the cilia. The hind tarsi of *hamameliella* are also very distinctly tipped with black, whereas, in *aceriella*, they are either faintly blackish tipped or entirely pure white. The oblique dorsal streak, which has been used to separate *hamameliella* from *aceriella*, cannot be relied upon, as this streak is often as oblique in *aceriella* as in *hamameliella*.

Lithocolletis tubiferella Clemens.

Plate XXIV, Fig. 13.

Lithocolletis tubiferella Clemens, Proc. Acad. Nat. Sci. Phil., 208, 1860.—Tin. No. Am., 140, 1872.—Chambers, Can. Ent., iii, 165, 183, 1871.—Walsingham, Ins. Life, ii, 24, 77, 1889; iii, 329, 1891.—Busck, Proc. Ent. Soc. Wash., v, 204, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6330.

"Head silvery white. Antennæ fuscous, slightly annulated with white; basal joint pale saffron. Forewings pale saffron, with two silvery white moderately broad bands, black margined externally, one near the base, and the other on the middle of the wing, and both somewhat oblique; cilia of the general hue. Hind wings dark grayish, cilia the same.

"The larva belongs to the second larval group of this genus, but the body is much more contracted than that of any other larva I have seen. Its form is almost that of a flattened ovoid, the rings separated by the deep incisions, and each forming in the sides a projecting mammilla.

"The larva mines the upper surface of the leaves of oaks in September, and doubtless also in the summer months. The mine is a linear tract, sometimes curved or wavy, gradually increasing in breadth from the beginning to the end, or, as the larva increases in length, with the frass deposited on each side of the tract, and marking its outline by two black lines. The position of the larva within the mine is likewise a peculiar one, as it is always placed transversely to its course, and hence the deposition of the frass on the sides, and the gradual increase in breadth, as the larva grows in length. Its head is blackish-brown; the body pale greenish, with pale brown dorsal maculæ, darker on their edges. It undergoes transformation in the end of the mine, preparing a circular cell or slightly silk-lined cavity, and leaves the last larval cast outside of it. The fall brood of larvæ become imagoes about the middle of May."

The above is Clemens' complete description of the species.

Mine of *L. tubiferella.*

The very characteristic mine cannot be mistaken for that of any other species. The mine is often branched, the larva returning toward the beginning of the mine, and starting out anew in another direction.

In the apex of the wing, there is sometimes a minute white spot, with a few black scales behind it. The alar expanse is 8 mm.

PORPHYROSELA,* new subgenus.

Porphyrosela differs from the typical *Lithocolletis* in the following characteristics: forewings somewhat more acuminate, vein 11 of the forewings absent (Plate XX, Fig. 8); basal joint of the antennæ without a pecten; hind tibiæ without hairs.

The subgenus is represented only by the following species:

Porphyrosela desmodiella Clemens.

Plate XXIV, Figs. 14, 15.

Lithocolletis desmodiella Clemens, Proc. Acad. Nat. Sci. Phil., 220, 1859.—Tin. No. Am., 65, 68, 1872.—Chambers, Can. Ent., iii, 127, 162, 1871.—Jn. Cin. Soc. Nat. Hist., ii, 189, 1879.—Frey and Boll, Stett. ent. Zeit., xxxvii, 227, 1876.—Walsingham, Trans. Am. Ent. Soc., x, 202, 1882.—Busck, Proc. Ent. Soc. Wash., v, 187, 1903.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6303.

Syn. *gregariella* Murtfeldt, Can. Ent., xiii, 245, 1881; xv, 139, 1883.—Walsingham, Proc. Zool. Soc. Lond., 146, 1897.

"Antennæ dark brown, tipped with a silvery hue. Front whitish, with a ruby colored lustre; frontal tuft dark brown. Thorax with a splendent ruby hue.

* From πόρφυρος, purple; and σέλας, signifying sheen.

Forewing ferruginous brown, ruby-tinted at the base, with two silvery bands dark margined on both sides, one near the base, and one in the middle of the wing. A costal and dorsal silvery spot near the tip, opposite to each other, and a costal silvery spot just before the tip, the two former dark margined on both sides, and the latter slightly dark margined. No hinder marginal line; the cilia opposite the last dorsal spot blackish, and the wing beneath the last costal spot golden brown. Hindwings pale brownish gray, cilia the same." [Expanse 4.5-5 mm.]

Originally described by Clemens as above from specimens from tentiform mines on the underside of *Desmodium viridiflorum* L. It has since been bred from mines on several allied plants, among them *Lespedeza capitata* Michx. and *Phaseolus pauciflorus* Benth.

Frey and Boll (Stett. ent. Zeit., xxxvii, 227, 1876) made note of the peculiar enlarged appearance of the apical third of the forewings.

The specimens described as *gregariella* were bred from large inflated mines on the underside of *Phaseolus pauciflorus* Benth., a number of imagoes emerging from one mine. In all other respects, except the gregarious larval habits, these are identical with *desmodiella*.

However, in a series bred by Mr. August Busck from similar mines on *Desmodium* at Washington, D. C., all of the specimens were noticeably smaller, the largest expanding but 3 mm., and almost all lacked any indication of the white costal streak before the cilia (Plate XXIV, Fig. 15).

On various species of *Lespedeza*, where both the gregarious and solitary larval habit is exhibited on the same plant, I have bred both varieties from the same mine.

CREMASTOBOMBYCIA,* new subgenus.

Cremastobombycia differs from *Lithocolletis* proper in the following characteristics: terminal joint of the labial palpi a little longer; vein 5 of the forewings present, 5 and 6 stalked, vein 6 of the hind wings present, 5 and 6 long stalked (Plate XX, Figs. 6, 7), sometimes borne on an independent stalk to near the base, where this stalk is short stalked with the upper median vein. The stalk is obsolete from the middle to the end of the cell (Plate XX, Fig. 6).

Larva cylindrical, without prolegs on 10, usually pale greenish or yellowish becoming darker at maturity. All of the species, as far as known, are miners in the leaves of various species of Compositæ, the mines being found upon the lower side of the leaf, except that of

* From κρεμαστός, suspended; and βομβύκιον, cocoon.

grindeliella Wlsm., which is also sometimes an upperside miner. The loosened epidermis is very much wrinkled longitudinally at maturity.

The species of this subgenus pupate in an elongate, dense, white cocoon (Plate XX, Fig. 13), sometimes ornamented with longitudinal ridges. This cocoon is suspended inside the mine by two slightly diverging silken threads at the posterior end, and by either one or two threads at the anterior end.

The markings of the forewings consist of a more or less distinctly developed basal streak; four white costal streaks, and two or three dorsal streaks. There may be one or two more or less distinctly angulated fasciæ, formed by the confluence of opposite streaks.

The species herein included represent a more ancestral type, more nearly related to the Gracilaria group of genera.

One species, *solidaginis* Frey and Boll, is found from the Atlantic to the Pacific; the other species have a more limited range.

The species may be separated by the following table:

A. Basal streak distinct, reaching almost to or beyond the basal fourth.
  B. With an angulated fascia at one-fourth.....**grindeliella.**
  BB. Without a fascia at one-fourth.
    C. Basal streak narrow, pointed, unmargined.....**solidaginis.**
    CC. Basal streak much dilated posteriorly.....**ambrosiella.**
AA. Basal streak minute or wanting.
  B. Markings with a brilliant silver lustre; costal and dorsal streaks at three-fourths never confluent.....**ignota.**
  BB. Markings not so brilliant; an angulated fascia at three-fourths. **verbesinella.**

Cremastobombycia grindeliella Walsingham.

Plate XXIV, Figs. 16, 22.

Lithocolletis grindeliella Walsingham, Ins. Life, iii, 327, 1891.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6299.

"Antennæ dull gray, with slightly paler annulations. Palpi grayish. Crown tufted with mixed iron gray and reddish brown scales; face grayish. Thorax ferruginous.

"Forewings pale ferruginous, dusted with iron gray and clouded with blackish scales beyond the middle of the wing to the apex; three whitish costal streaks, very indistinct, at about equal distances apart, the first and second of which are outwardly oblique and are met at a somewhat acute angle on the middle of the wing by two even less distinct dorsal streaks, faintly dark margined externally; the third is a mere spot, opposite which is a small spot at the base of the cilia at the anal angle; immediately preceding the apex is a conspicuous curved white costal spot divided from a smaller and less conspicuous one below it by the cloudy streak of black scales which runs to the apex; cilia with a ferruginous tinge, becoming gray at and within the anal angle, and having a few black scales below the apex.

"Hindwings and cilia gray. Abdomen dull gray; anal tuft pale. Legs whitish, tarsal joints unspotted, tibiæ barred with gray externally. Expanse 8 mm."

With the exception of the omission of any mention of the basal streak, which is confluent with the first fascia just below the fold, the above description by Lord Walsingham is that of the typical form of the species, in which the first fascia attains the dorsal margin. In another variety (Fig. 22, Plate XXIV), the first fascia ends abruptly just below its angle and does not unite with the basal streak. All gradations exist between these two varieties.

The species was originally described from a specimen from Alameda Co.; I have bred a large series from Marin Co., California.

The mines occur upon either the upper or lower surface of leaves of *Grindelia robusta*. In the upperside mines the leaf is more contracted and the epidermis is thrown into more distinct folds than is the case in the lower side mines. The elongate white silken cocoon is attached at its posterior end by two fine threads, and at its anterior end by a rather broad band of silk.

Cremastobombycia solidaginis Frey and Boll.

Plate XXIV, Fig. 17.

Lithocolletis solidaginis Frey and Boll, Stett. ent. Zeit., xxxvii, 223, 1876.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6298.

Syn. *solidaginisella* Chambers, Jn. Cin. Soc. Nat. Hist., ii, 190, 1880.

Antennæ grayish, distinctly annulate with dark brown. Face and palpi yellowish white. Tuft brownish ocherous, white at the sides. Thorax and forewings reddish ocherous; a white stripe on each side of the thorax continuous with a rather indistinct whitish basal streak on the forewings below the fold, ending at one-third. Four white costal streaks, of which the first two are oblique, and situated at one-third and at the middle of the wing length respectively. The third is at two-thirds, and nearly perpendicular and the fourth just before the apex and inwardly oblique. All are dark margined externally with dark brown, the margin of the last forming the dusting of the apex. A long, oblique dorsal streak commences near the middle of the dorsal margin; its dark margin usually unites with that of the second costal; sometimes the streaks themselves unite. Opposite the third costal an oblique dorsal streak is indicated by a slightly lighter shade and a few dark scales behind it. Hinder marginal line in the cilia brownish, rather indistinct. Cilia ocherous. Alar expanse 7-9 mm.

Hindwings and cilia ocherous gray. Abdomen gray; anal tuft ocherous. Legs whitish, banded with ocherous; tarsal joints tipped with black.

A common species in the United States, making elongate, much wrinkled mines upon the under surface of leaves of goldenrod, *Solidago*. The dense white cocoon, marked with longitudinal ridges, is suspended hammock-like within the mine, by a single silken thread

at the anterior end and by two diverging threads at the posterior end. When the imago emerges the pupa case is thrust through the upper epidermis.

Cremastobombycia ambrosiella Chambers.

Plate XXIV, Fig. 18.

Lithocolletis ambrosiella Chambers, Can. Ent., iii, 127, 1871.—Cin. Quart. Jn. Sci., ii, 100, 1875.—Frey and Boll, Stett. ent. Zeit., xxxvii, 221, 1876; xxxix, 267, 1878.—Walsingham, Ins. Life, ii, 54, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6321.

Syn. *amœna* Frey and Boll, Stett. ent. Zeit., xxxix, 269, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6285.

Antennæ gray, annulate with dark brown. Face and palpi whitish, sometimes with a deep blue-gray metallic lustre.

Thorax and forewings reddish saffron. A fine white line on each side of the thorax is continuous with a short basal streak broadening toward the end, where it is faintly dark margined. At the basal fourth is an oblique white costal streak, dark margined externally. Very rarely there is a minute white spot on the dorsal margin, with a few black scales behind it. About the middle is a white fascia, sometimes angulated, margined with black behind and with a slightly darker shade before. At the beginning of the cilia there is a white costal streak and a slightly oblique dorsal one opposite, both dark margined behind and faintly so before. Just before the apex is a curved white streak, sometimes attaining the dorsal margin, with a few dark scales behind it in the apex of the wing. Cilia of the wing color, grayish toward the tornus. Expanse 5.5–6.5 mm.

Hindwings gray, cilia with a fulvous tinge. Abdomen gray, somewhat metallic, tuft tinged with ocherous. Legs fuscous, tarsi white, broadly annulate with black.

Widely distributed in the east, also occurring as far south and west as Texas (Boll). The larvæ mine the leaves of *Ambrosia trifida* L. and *Ambrosia artemisiaefolia* (L.) Britton, and of *Verbesina alternifolia* (L.) Britton (*Actinomeris squarrosa* Nutt.). The mine is very small, placed upon the under suface, and is not visisble on the upperside as an inflated swelling, as is that of *ignota*. The dense white fusiform cocoon, suspended hammock-like in the mine, has a smooth surface, lacking entirely the longitudinal ridges characteristic of that of *ignota*.

Easily distinguished from *ignota* in its early stages, the imagoes may be distinguished from that species by the broad white basal streak, which in the form described by Frey and Boll as *amœna*, attains the dorsal margin; by the absence of the brilliant silvery lustre of the white markings. *Amœna* lacks the dark margins present on the type of *ambrosiella*. Bred specimens show great variation in the distinctness of these margins.

Cremastobombycia ignota Frey and Boll.

Plate XXIV, Figs. 19, 20.

Lithocolletis ignota Frey and Boll, Stett. ent. Zeit., xxxiv, 215, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 206, 1874.; ii, 230, 1875.—Walsingham, Ins. Life, ii, 54, 119, 1889.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6320.

Syn. *bostonica* Frey and Boll, Stett. ent. Zeit., xxxiv, 216, 1873.—Chambers, Cin. Quart. Jn. Sci., i, 206, 1874; ii, 230. 1875.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6319.—*helianthisella* Chambers, Cin. Quart. Jn. Sci., i, 205, 1874.—*helianthivorella* Chambers, Cin. Quart. Jn. Sci., ii, 100, 1875. *elephantopodella* Frey and Boll, Stett. ent. Zeit., xxxix, 268, 1878.—Busck, Proc. U. S. Nat. Mus., xxiii, 247, 1900.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6322.—*actinomeridis* Frey and Boll, Stett. ent. Zeit, xxxix, 268, 1878.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6324.

Antennæ brownish gray, annulate with darker. Face and palpi pale golden. Tuft reddish saffron, intermixed with white.

Thorax and forewings deep reddish saffron. A fine white line on each side of the thorax is continuous with a very indistinct and short basal silvery streak beneath the fold, consisting of a few scales. At the basal fourth of the wing is an oblique silvery costal streak, black margined externally, and sometimes on the costa before; rarely entirely unmargined. On the dorsal margin, slightly nearer the base, is a small dorsal spot, sometimes represented by but two or three silvery scales, rarely margined behind with one or two dark scales. At the middle of the wing is a silvery fascia, varying from nearly straight to acutely angled. In the former case the fascia is broader, strongly margined externally and on the costa before with black. In those specimens having a distinctly angulated fascia, the fascia is narrower, sometimes interrupted at the angle, its external black margin less distinct, and usually not dark margined internally. At the apical third are two opposite rather large, perpendicularly placed silvery streaks, black margined behind, and the costal one sometimes on the costa before. Just before the apex is an outwardly concave silvery costal streak, sometimes attaining the dorsal margin, and sometimes with a few black scales before. Behind it, in the apical portion of the wing, are a few black scales. Cilia slightly paler than the wing color, shading to gray toward the tornus. Expanse 6.5–7.5 mm.

Hindwings and cilia brownish gray, the latter with a purplish lustre. Abdomen above dark brown, with a metallic lustre. Legs fuscous, all the tarsi annulate with black.

Widely distributed, occurring from Massachusetts to Texas, and feeding on various species of Compositæ. Among its recorded food plants are *Verbesina alternifolia* (L.) Britton (=*Actinomeris squarrosa* Nutt.), *Elephantopus Carolinianus* Willd. and *Verbesina Virginica* L. These three are the food plants recorded by Boll from Texas. Mr. August Busck bred the species from *Elephantopus Carolinianus* Willd., at Washington, D. C., and Mr. Chambers on *Helianthus giganteus* L. from Kentucky.

The rather large tentiform mine occurs on the lower surface of the leaf. The loosened epidermis becomes much wrinkled in the

later stages, and the mine is distinctly visible on the upper surface as a tubercular swelling. The larva, which is pale in the earlier stages, becomes dark brown just before pupation. The dense white elongate cocoon, ornamented with longitudinal ridges, is suspended in the mine at each end by two silken threads.

The series of specimens from which the above description was made were bred from mines on *Verbesina alternifolia* (L.) Britton at Cincinnati, Ohio. Frey's description of *actinomeridis* is applicable to those specimens having the straighter fascia, and heavier margins of the silvery marks. A specimen bred by Mr. August Busck on *Elephantopus Carolinianus* Willd. is identical with these. The description of *elephantopodella* agrees with those specimens having the angulated fascia, and narrower and less distinctly dark margined silvery marks. Frey has described *ignota* as having unspotted hind tarsi; in none of my series is this true. This variation in the markings of the tarsi occurs frequently, and cannot be considered of specific value. Chambers' types of *helianthivorella* all have the hind tarsi distinctly annulate with black, show considerable variation in the angulation of the silvery fascia, and have the minute basal streak.

Cremastobombycia verbesinella Busck.

Plate XXIV, Fig. 21.

Lithocolletis verbesinella Busck., Proc. U. S. Nat. Mus., xxiii, 246, 1900.—Dyar, Bull. 52, U. S. Nat. Mus., 1902, No. 6323.

"Antennæ silvery white, with black annulations, last four or five joints white. Labial palpi silvery white. Face golden iridescent white; tuft on head reddish yellow, with a few white scales. Thorax and forewing deep golden yellowish brown. At basal third is a silvery white costal streak directed outward, strongly margined externally with black. At the middle of the wing is a silvery white, outwardly angulated fascia, and at the beginning of costal cilia another similar one, both strongly margined externally with black. Just before apex is a third small silvery white fascia with a few scattered black scales externally. Cilia light golden yellow. Hindwings dark silvery gray, cilia a shade lighter. Abdomen above dark gray; underside silvery and golden yellow. Legs silvery, with broad black annulations. Alar expanse 6.4 mm."

Described as above by Mr. August Busck from a single specimen bred from *Verbesina Virginica*, collected at Palm Beach, Florida, by Dr. Dyar.

Mr. Busck has given the following note upon the early stages: "The larva makes a roomy tent-shaped mine on the underside with the lower epidermis much wrinkled longitudinally, and pupates in an elongate white cocoon suspended at both ends like a hammock inside the mine. Larva belongs to the cylindrical group."

LIST OF SPECIES.

Lithocolletis Hübner.

♀

fitchella *Clem.*
leucothorax *Wlsm.*
bataviella sp. nov.
trinotella *Braun.*
quercialbella *Fitch.*
clemensella *Cham.*
argentifimbriella *Clem.*
lucidicostella *Clem.*
albanotella *Cham.*
insignis *Wlsm.*
hageni *Frey and Boll.*
arbutusella sp. nov.
obscuricostella *Clem.*
ostryæfoliella *Clem.*
rileyella *Cham.*
kearfottella *Braun.*
caryæalbella *Cham.*
olivæformis sp. nov.
martiella sp. nov.
gemmea *Frey and Boll.*
morrisella *Fitch.*
uhlerella *Fitch.*
robiniella *Clem.*
auronitens *Frey and Boll.*
diaphanella *Frey and Boll.*
minutella *Frey and Boll.*
scudderella *Frey and Boll.*
ledella *Wlsm.*
salicivorella *Braun.*
deceptusella *Cham.*
alnicolella *Wlsm.*
alni *Cham.*
malimalifoliella *Braun.*
cratægella *Clem.*
propinquinella sp. nov.
incanella *Wlsm.*
populiella *Cham.*
sexnotella *Cham.*
æriferella *Clem.*
obsoleta *Frey and Boll.*
argentinotella *Clem.*
occitanica *Frey and Boll.*
apicinigrella sp. nov.
basistrigella *Clem.*
celtisella *Cham.*
lucetiella *Clem.*
symphoricarpella *Cham.*
ostensackenella *Fitch.*
tritænianella *Cham.*
affinis *Frey and Boll.*
mariæella *Cham.*
tiliacella *Cham.*
oregonensis *Wlsm.*
fragilella *Frey and Boll.*
salicifoliella *Clem.*
tremuloidiella *Braun.*
celtifoliella *Cham.*
? lysimachiæella *Cham.*

♀ ♀

gaultheriella *Wlsm.*
nemoris *Wlsm.*
caryæfoliella *Clem.*
lentella sp. nov.
saccharella *Braun.*
macrocarpella *Frey and Boll.*
cincinnatiella *Cham.*
hamadryadella *Clem.*
umbellulariæ *Wlsm.*
agrifoliella *Braun.*
conglomeratella *Zell.*
ulmella *Cham.*
quercivorella *Cham.*
mediodorsella sp. nov.
australisella *Cham.*
chambersella *Wlsm.*
cervina *Wlsm.*
platanoidiella *Braun.*
fletcherella sp. nov.
arcuella *Braun.*
betulivora *Wlsm.*
eppelsheimii *Frey and Boll.*
bethunella *Cham.*
fasciella *Wlsm.*
castaneæella *Cham.*
guttifinitella *Clem.*
obstrictella *Clem.*
corylisella *Cham.*
æsculisella *Cham.*
ostryarella *Cham.*
aceriella *Clem.*
hamameliella *Busck.*
tubiferella *Clem.*

Porphyrosela new subg.

desmodiella *Clem.*

Cremastobombycia new subg.

grindeliella *Wlsm.*
solidaginis *Frey and Boll.*
ambrosiella *Cham.*
ignota *Frey and Boll.*
verbesinella *Busck.*

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Italicized names are synonyms, or refer to European species formerly included in our fauna.

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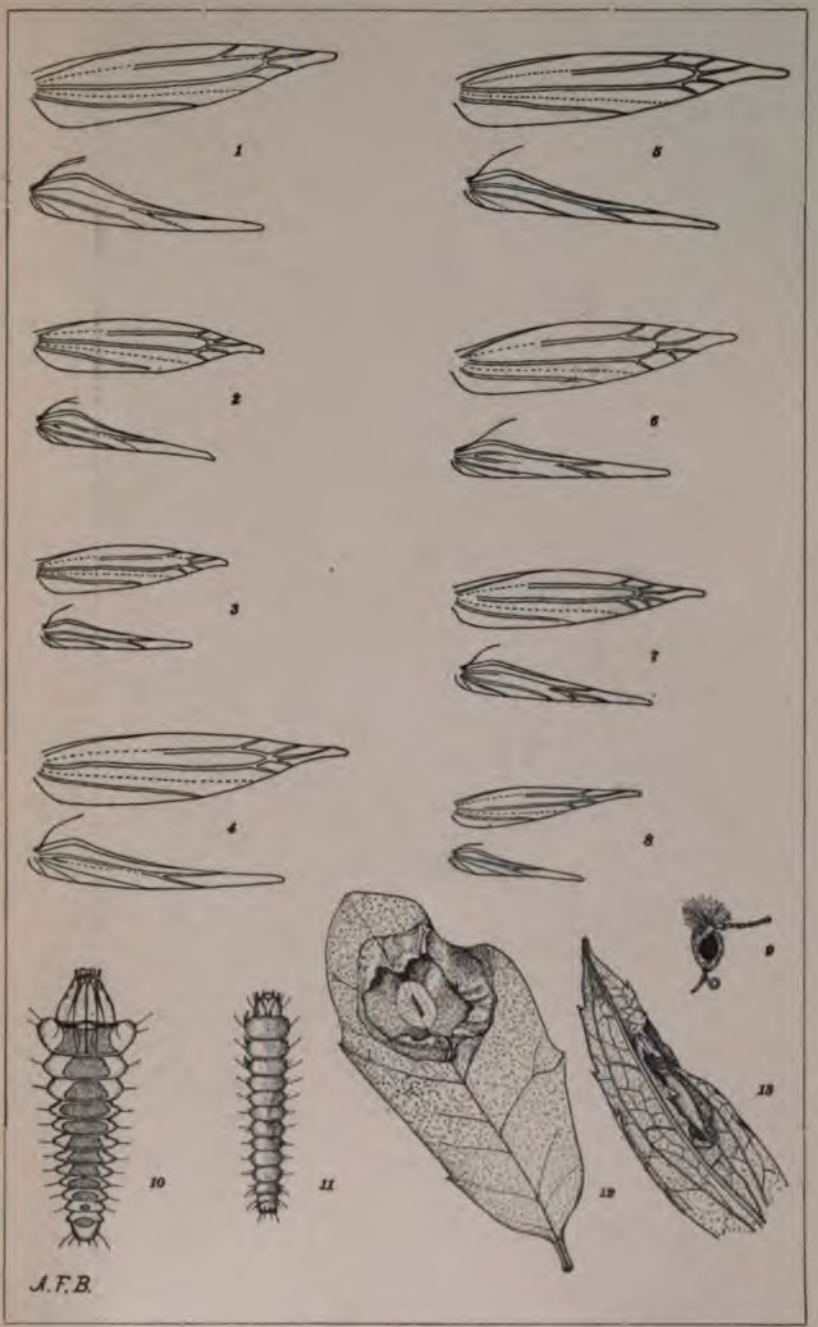
ERRATA.

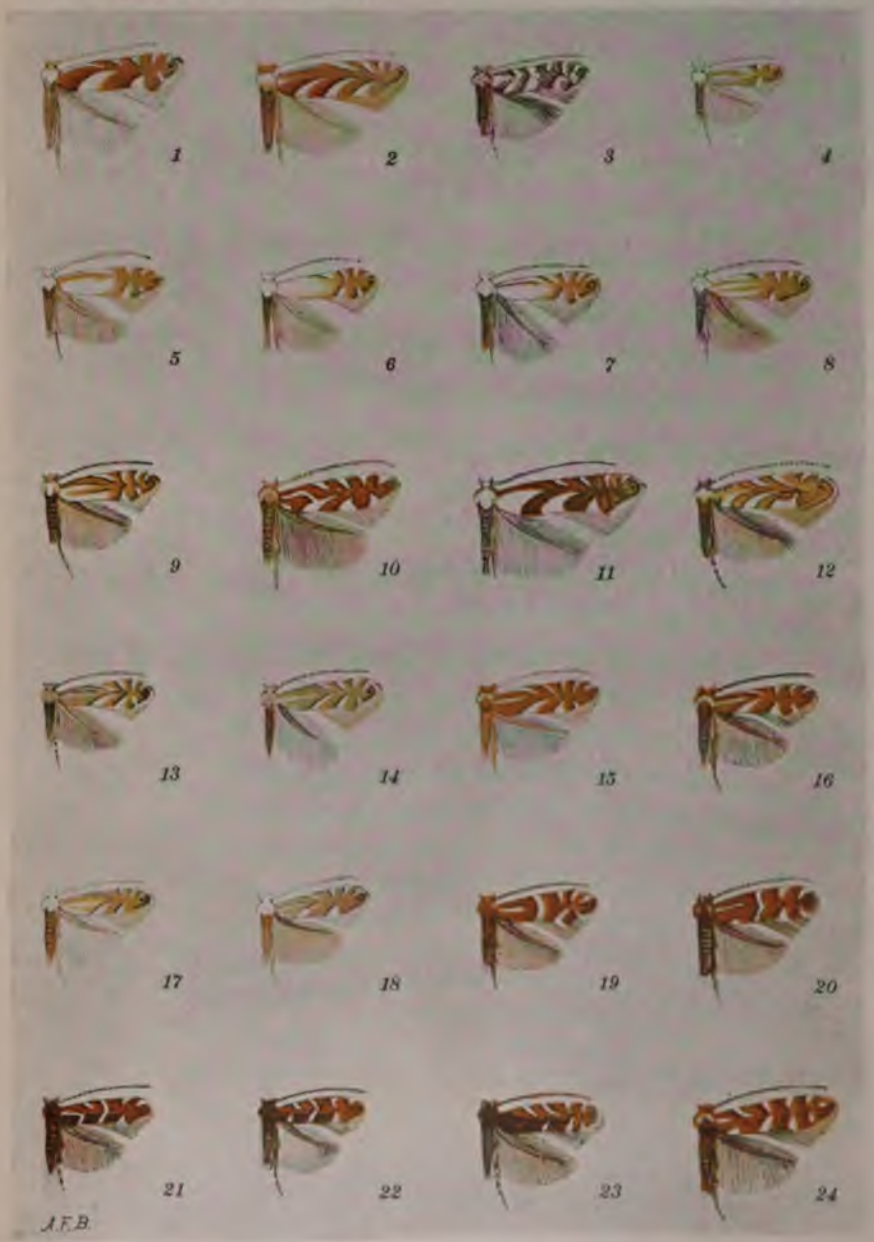
Page 289, line 9 from the top, read *golden* instead of *golded*.
Page 291, line 3 from the bottom, read *Argyromiges* instead of *Argyromigea*.
Page 294, line 17 from the top, read *follow two very small* instead of *follow very small*.
Page 296, last word of line 2 from the bottom, should be *anal* instead of *and*.
Page 301, line 26 from the top, read *almost* instead of *also*.
Page 336, line 4 from the bottom, read *is* instead of *in*.



BRAUN ON LITHOCOLLETIS.

EXPLANATION OF PLATE XXI.

1. *Lithocolletis fitchella* Clem.
2. " *leucothorax* Wlsm., type, U. S. N. M.
3. " *bataviella* sp. nov., type.
4. " *trinotella* Braun, type, coll. W. D. Kearfott.
5. " *quercialbella* Fitch.
6. " *clemensella* Cham.
7. " *argentifimbriella* Clem.
8. " *lucidicostella* Clem.
9. " *albanotella* Cham.
10. " *insignis* Wlsm., type, U. S. N. M.
11. " *hageni* Frey and Boll.
12. " *arbutusella* sp. nov., type, U. S. N. M.
13. " *obscuricostella* Clem.
14. " *ostryæfoliella* Clem.
15. " *rileyella* Cham., type, U. S. N. M.
16. " *kearfottella* Braun, type.
17. " *caryæalbella* Cham., type, Mus. Comp. Zool.
18. " *olivæformis* sp. nov., type, U. S. N. M.
19. " *martiella* sp. nov., type, U. S. N. M.
20. " *gemmea* F. and B., type, Mus. Comp. Zool.
21. " *morrisella* Fitch.
22. " *uhlerella* Fitch.
23. " *robiniella* Clem.
24. " *auronitens* F. and B., type, Mus. Comp. Zool.



BRAUN ON LITHOCOLLETIS.

EXPLANATION OF PLATE XXII.

1. *Lithocolletis diaphanella* F. and B.
2. " *scudderella* F. and B.
3. " *ledella* Wlsm., type, U. S. N. M.
4. " *salicivorella* Braun, type, coll. W. D. Kearfott.
5. " *deceptusella* Cham., type, Mus. Comp. Zool.
6. " *alnicolella* Wlsm., type, U. S. N. M.
7. " *malimalifoliella* Braun, type.
8. " *cratægella* Clem.
9. " *propinquinella* sp. nov., type.
10. " *incanella* Wlsm., type, U. S. N. M.
11. " *populiella* Cham.
12. " *sexnotella* Cham.
13. " *æriferella* Clem.
14. " *obsoleta* F. and B., type, Mus. Comp. Zool.
15. " *argentinotella* Clem.
16. " *apicinigrella* sp. nov., cotype, U. S. N. M.
17. " *basistrigella* Clem.
18. " *celtisella* Cham.
19. " *lucetiella* Clem.
20. " *symphoricarpella* Cham.
21. " *ostensackenella* Fitch.
22. " *tritæniella* Cham.
23. " *marixella* Cham.
24. " *tiliacella* Cham.

BRAUN ON LITHOCOLLETIS.

EXPLANATION OF PLATE XXIII.

1. *Lithocolletis fragilella* F. and B.
2. " *salicifoliella* Clem.
3. " " "
4. " *tremuloidiella* Braun, type.
5. " *celtifoliella* Cham.
6. " *gaultheriella* Wlsm.
7. " *nemoris* Wlsm., type, U. S. N. M.
8. " *caryæfoliella* Clem.
9. " *lentella* sp. nov., cotype.
10. " *saccharella* Braun, type.
11. " *macrocarpella* F. and B.
12. " *cincinnatiella* Cham.
13. " *hamadryadella* Clem.
14. " *umbellulariæ* Wlsm., type, U. S. N. M.
15. " *agrifoliella* Braun, type.
16. " *conglomeratella* Zell.
17. " *ulmella* Cham.
18. " *quercivorella* Cham.
19. " *mediodorsella* sp. nov., type, U. S. N. M.
20. " *australisella* Cham., type, Mus. Comp. Zool.
21. " *chambersella* Wlsm., type. Mus. Comp. Zool.
22. " *cervina* Wlsm., type, U. S. N. M.
23. " *platanoidiella* Braun, type.
24. " *fletcherella* sp. nov., type.

BRAUN ON LITHOCOLLETIS.

EXPLANATION OF PLATE XXIV.

1. *Lithocolletis arcuella* Braun, type.
2. " *betulivora* Wlsm.
3. " *bethunella* Cham.
4. " *fasciella* Wlsm.
5. " *castaneæella* Cham.
6. " *guttifinitella* Clem.
7. " *obstrictella* Clem.
8. " *corylisella* Cham.
9. " *æsculisella* Cham.
10. " *ostryarella* Cham.
11. " *aceriella* Clem.
12. " *hamameliella* Busck.
13. " *tubiferella* Clem.
14. *Porphyrosela desmodiella* Clem.
15. " " "
16. *Cremastobombycia grindeliella* Wlsm.
17. " *solidaginis* F. and B.
18. " *ambrosiella* Cham.
19. " *ignota* F. and B.
20. " " "
21. " *verbesinella* Busck, type U. S. N. M.
22. " *grindeliella* Wlsm.
23. *Lithocolletis apicinigrella* sp. nov., cotype.
24. " *salicifoliella* Clem. (*atomariella* Zell.).

BRAUN ON LITHOCOLLETIS.

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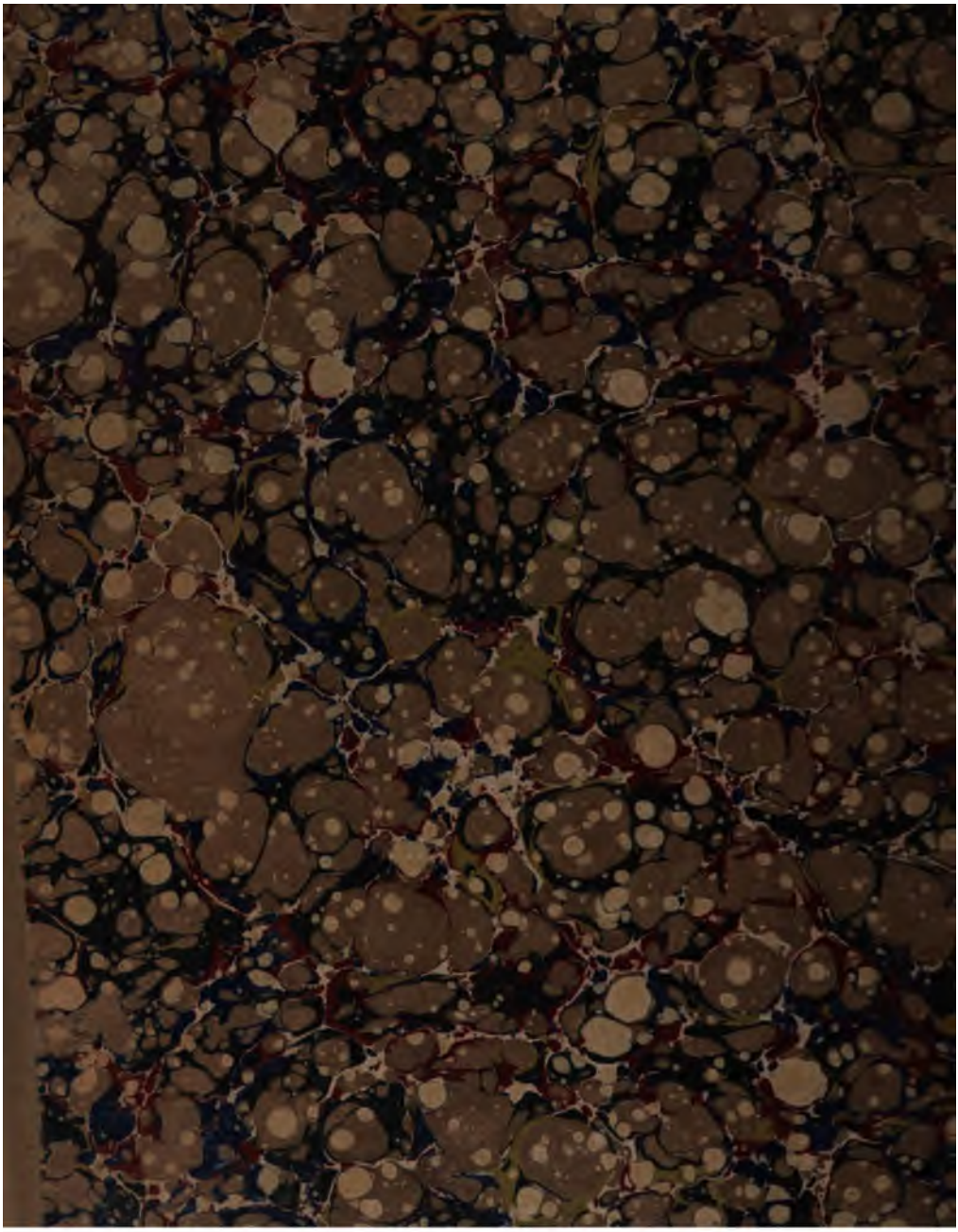

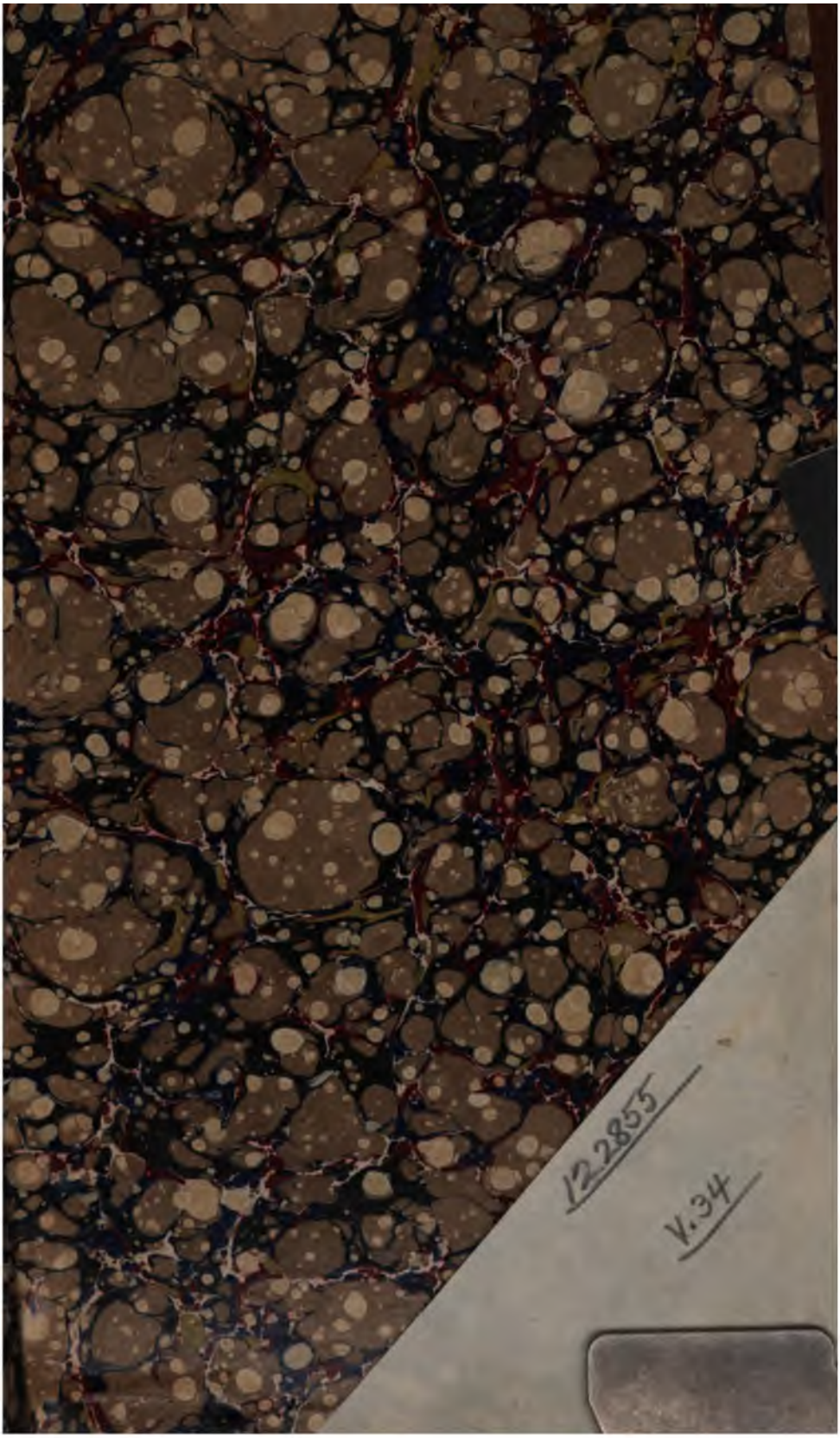
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